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Sir:

Transmitted herewith for filing under 37 CFR 1.53(b) is the
[**X**] patent application of
[ ] continuation patent application of
[ ] divisional patent application of
[ ] continuation-in-part patent application of

Inventor(s)/Applicant Identifier: Jonathan J. Hull, Derek Poppink, Marko Balabanovic, Michael Baxter, Jamey Graham, Peter Hart, Dar-Shyang Lee, and Gregory Wolff

For: A NETWORKED PERIPHERAL FOR VISITOR GREETING, IDENTIFICATION, BIOGRAPHICAL LOOKUP AND TRACKING

[**X**] This application claims priority from each of the following Application Nos./filing dates:
60/166,081, November 17, 1999
the disclosure(s) of which is (are) incorporated by reference.

[ ] Please amend this application by adding the following before the first sentence: "This application is a [ ] continuation [ ] continuation-in-part of and claims the benefit of U.S. Provisional Application No. 60/_____, filed _____, the disclosure of which is incorporated by reference."

Enclosed are:
[**X**] 25 page(s) of specification
[**X**] 1 page of title sheet
[**X**] 5 page(s) of claims
[**X**] 1 page of Abstract
[**X**] 22 sheet(s) of [ ] formal [**X**] informal drawing(s).
[**X**] Information Disclosure Statement under 37 CFR 1.97, Form PTO-1449, and one reference.

In view of the Unsigned Declaration as filed with this application and pursuant to 37 CFR §1.53(f), Applicant requests deferral of the filing fee until submission of the Missing Parts of Application.

DO NOT CHARGE THE FILING FEE AT THIS TIME.

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Does a Video Diary Help Recall?

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Does a Video Diary Help Recall?

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The purpose of this paper is to determine the value of video recording in aiding the recall of work activities. A Video Diary System is described and the results of a preliminary evaluation of the system are presented. The memory experiment provided subjects with several different memory aids. The use of a Video Diary increased the number of activities which were recalled compared to using only a written diary. People and objects were particularly valuable cues in aiding the recall of work activities. Although the Video Diary was very useful, it clearly does not completely capture the events of the working day.

Keywords: Memory, multi-media, video

1. Introduction

The purpose of this paper is to determine the value of video recording in aiding the recall of work activities. We have designed a Video Diary System which uses low resolution time-lapsed video, with no audio recording. In this paper we will describe this system and discuss some preliminary results on its utility. Before we begin the description of the system itself, we will present some related work which is being carried out at EuroPARC.

1.1. The Human Memory Prosthesis

People at work deal with a vast amount of information. Information is passed to people in informal conversations or in formal meetings; information is contained in electronic or paper documents; and information is communicated over telephone networks. This information explosion necessarily increases the load on the human memory at work, and although the computer enables vast amounts of information to be stored, it does little to help the retrieval of this stored information.

The aim of a research project at EuroPARC called "Activity-based Information Retrieval" (AIR) is to use technology to support human memory by increasing the ability to recall or retrieve information [Lamming & Newman, 1992]. The essential idea of this project is to automatically collect contextual information about human activities, and to use this

contextual information to help the later recall of past activities. As part of this project, we are working on the development of a "human memory prosthesis", which will be implemented as an application running on a light-weight wireless notepad-style computer.

For each user of the human memory prosthesis, a detailed personal autobiography will be maintained by the AIR system. This autobiography will include information about events in the user's working life: phone calls, workstation activities, meetings attended, papers read, and so on. Each of these activities will be time-stamped, and thus information about one activity can be used to cross-index to other activities. For example, suppose you want to remember which document you were working on when you had a phone conversation with someone last week. By posing a query concerning an aspect of the past that you do remember (i.e., the phone call last week), you can find out more information about the aspect of the past that you do not remember (i.e., the particular version of the document). Thus, a user's knowledge about the context of activities can be used as an input to the human memory prosthesis, and the AIR technology can be used to help retrieve information that might otherwise be difficult, or impossible, to retrieve.

The importance of contextual information in assisting the recall of activities is well known in the human memory literature [e.g., Smith, Glenberg & Bjork, 1978; Tulving, 1983]. There is also evidence that time-based contextual information is important in the way that various memories are structured; for example, Barsalou [1988] describes a theory of memory in which temporal cues link various memories. We are basing our design of the human memory prosthesis on research findings and insights derived from studies about how human memory behaves in the recall of everyday activities.

1.2. Early Experiments

One of our first experiments with collecting information about work activities used a system called Pepys, a program designed to make inferences about people's activities based on automatically-collected location data [Newman, Eldridge & Lamming, 1991]. These location data are gathered via an Active Badge System [Want, Hopper, Falcao & Gibbons, 1992], which is part of the technical infrastructure at EuroPARC. Active badges are small security-tag devices which are worn on the clothing. Each badge emits a unique identification code using infra-red signals. The code is repeated approximately every 15 seconds and is picked up by wall-mounted sensors located throughout the building. Sensors are connected to a UNIX-based badge monitoring service called the Badge Server which keeps track of which badge has been observed by which sensor, and thus deduces the location of each badge wearer. The Badge Server is also responsible for notifying Pepys and other authorised client applications whenever a location change is observed.

These location data are processed by Pepys, and the descriptions of work activities are presented to users in the form of a diary (see Figure 1). The episodes are time-stamped and include such activities as conversations and meetings with other people, and periods spent alone in the office. Although these diaries were presented to users via e-mail, this implementation was a prototype, and the plan is eventually to build an interactive version and incorporate it into the human memory prosthesis.

Diary for Tuesday, October 30, 1991

14:14 In office [50 mins]
15:04 In and out of event in Nathan's office; with W. Nathan, R. Hatton [45 mins]
15:50 In office [10 mins]
16:00 In Conference room [4 mins]
16:05 Attended part of event in Commons; with B. Andrews, M. Morton, R. Hatton [7 mins]
16:13 Mostly in office [44 mins]
16:57 Attended event in Wright's office; with P. Wright [7 mins]
17:04 Looked in on event in Morton's office; with I. David, M. Morton [1 min]
17:05 Mostly in office [2 hr 3m]
  17:05 In office [5 mins]
  17:11 In event in office; with P. Wright, I. David [1h 2mins]
  18:13 In office [36 mins]
  18:50 Meeting in office; with W. Nathan [13 mins]
  19:03 In office [5 mins]
19:09 In 2nd floor rear area [2 mins]
19:11 Last seen

Figure 1. An example of a Pepys diary

Although the overall accuracy of the episode descriptions generated by Pepys was found to be very high [Newman et al., 1991], there are some problems regarding the utility of the information that is presented to the users. One problem is that for long periods spent alone in one's office, there is no additional information provided in the diary that might help a user recall what he or she was doing. In addition, for meetings which repeatedly involve the same people, there is no additional information provided which can help distinguish one meeting from another.

To overcome this lack of information in the Pepys diary, we have started looking at capturing data related to other activities. We are currently pursuing the capture of information related to workstation activities [Lamming & Newman, 1992] and paperwork activities [Newman, 1991; Newman & Wellner, 1992] which should add much richer information to the periods spent alone in one's office. We are also looking at note-taking and white-board activities [Lamming & Newman, 1992] to augment the information concerning meetings.

Another approach is to video record a user's activities. Although this would undoubtedly help distinguish the many similar episodes in the Pepys diaries, this method is not without its problems. For example, can these video images be captured automatically; and, perhaps more importantly, can the resulting information be browsed and searched efficiently on a personal workstation?

2. The EuroPARC Video Diary System

Our goal was to create a system capable of storing many days or months worth of video images, and which would provide users with rapid, random access to the video recording.

There were several reasons why we did not want to include audio recording. First, although it is possible to increase the speed of a video recording and still make sense of the images, if audio recordings are increased to correspondingly high speeds, the signal is no longer intelligible (hence video cassette recorders do not play audio when using fast forward). Second, we felt that people would object to audio recording over such a long period of time. And, third, we knew that there were technical problems with recording audio in addition to video (e.g., problems of synchronisation of the two signals, additional storage requirements, etc.).

Capturing video images of people engaged in their day-to-day work activities posed two initial problems: how can a person remain in camera shot throughout the course of his or her activities; and can the potentially large amount of video information be reduced to manageable yet useful proportions? These problems are addressed by the various components of the Video Diary System. Figure 2 shows a diagram of the system, and each of the components is described below.

2.1. The Video Network

We are fortunate at EuroPARC in having a technical infrastructure which greatly helps in addressing the problem of how to keep a person within camera shot. In addition to the Active Badge System, described in the Introduction, the technical infrastructure includes a computer-controlled switched analogue audio/video network. For the purposes of the current project, only the video links in this network will be described, since no audio recording takes place with the Video Diary System.

Each office and open space within EuroPARC contains a video camera which is aimed at the region where the majority of the activity occurs. Each camera is connected to one input of a crossbar video switch (i.e., a switch where any input can be connected to any number of outputs). The outputs of the switch are connected to a variety of video sinks, usually monitors. The crossbar switch is under the control of a UNIX-based switch control server [Buxton & Moran, 1990] which is responsible for making and breaking video connections in response to user or program requests. This Video Switch allows each video source to be connected to more than one sink. Requests arrive at the Video Switch via an Ethernet LAN; the switch then checks to see that the requestor has permission to make the desired connection and either executes or rejects the request. This authentication step is necessary to prevent accidental or unauthorised video snooping. With this system it is possible to switch cameras as the need arises to ensure that an individual is almost always kept in shot, in a manner analogous to that of a television director.

2.2. The Tracker Program

We wanted to provide a way for the cameras to be switched automatically without the intervention of a human "director". This switching is accomplished using a custom-built client of the Badge Server called the Tracker Program.

When a person starts the Tracker Program running on his or her workstation the program first obtains the person's login credentials. The program then registers with the Badge Server for information about that person's movements, and the movements of other active

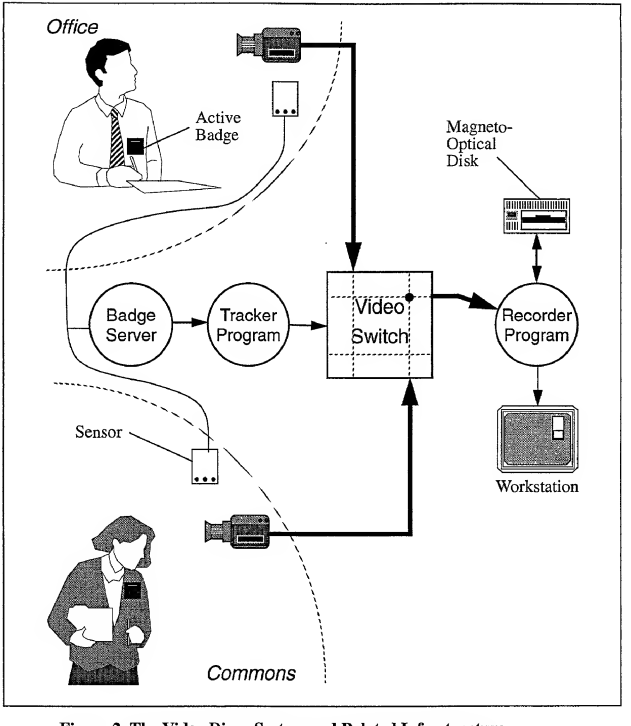

Figure 2. The Video Diary System and Related Infrastructure

badge wearers are private. As the person being tracked arrives at a new location, the Tracker Program is notified and in turn formulates a switch request which is passed on to the Video Switch. The resultant video signal is passed to the workstation where it is fed to a frame grabber, digitised and displayed on the workstation display. A person can thus ensure that an almost continuous display of his or her working day is presented on the workstation. To remind other people in the building that still images are being recorded, a sound effect of a camera shutter clicking is played periodically at background volume into the room where the person is located.

2.3. Recorder Program

Our aim was to store many days or weeks of data. An uncompressed video source would normally generate an unmanageable amount of data, both because human intervention would be needed several times a day to change disks or tapes as they became full, and because random access and fast playback would be difficult to achieve. Compression technology can reduce the storage requirements considerably, but such technology was not available to us.

The Recorder Program captures low resolution images at a much reduced frame rate and stores the results on exchangeable magneto-optical disks. An early prototype of this program showed that acceptable performance and quality could be achieved with quarter-size frames (one sixteenth of the area) recorded at the rate of a frame every five to ten seconds. An eight bit-per-pixel colour dithering technique was used which resulted in a frame size of about 25 kilobytes. As a further refinement, the Recorder Program compares consecutive frames for differences at the pixel level. If fewer than 1% of the pixels change between frames, then the frames are deemed to be the same and the later frame is discarded. With this relatively unsophisticated scheme, and under normal operating conditions, two weeks worth of data easily fits onto a single 650 megabyte magneto-optical disk.

The Recorder Program also provides playback facilities for a day's worth of data or more. Figure 3 shows the main control panel of the Recorder Program. The user of this program first specifies a day by using the "Open..." button; this brings up a panel which allows the user to choose a particular file which contains a day's worth of video data. The user can then play back the recording at various speeds by using the "Control..." button; this brings up a panel which allows the user to adjust the wait between frames, to a rate up to 60 times normal. To begin the playback, the "Go" button is pressed. This button is a toggle which allows the user to start and stop the playback at any time. The user can move a horizontal slider control to provide instant random access to the recording; the frame currently being viewed is displayed in the "Frame" field. Using the slider control, a whole day can be reviewed in just a few seconds, or a sequence can be repeatedly reviewed by gently "jiggling" the slider left and right over a segment of particular interest. To step through the recording one frame at a time, the user operates the up and down arrows to the right of the "Frame" field.

3. Evaluation

The Video Diary System is a proposed component of the human memory prosthesis. We would like to know whether the visual information provided by this system will be useful in helping people recall information related to events in their working lives. Given that a Video Diary is found to be useful, we would also like to understand what aspects of the Video Diary are most important in aiding this recall.

We conducted a preliminary evaluation of the utility of the Video Diary System by running a memory experiment using several people at EuroPARC as subjects. From some previous work undertaken as part of the AIR project, we knew that people forget many activities in their working lives, even after periods as short as one week. We therefore wanted to see whether or not the Video Diary System could improve a person's ability to recall work

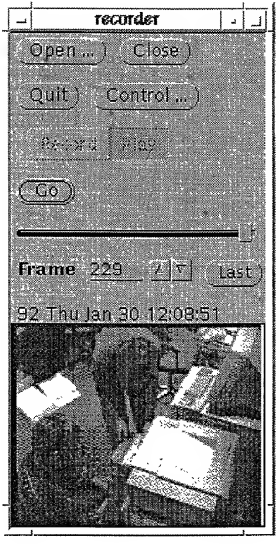

Figure 3. The main control panel of the Recorder Program

activities, and also whether or not it provided more useful retrieval cues than those provided in the Pepys diary (see Figure 1).

3.1. Method and Experimental Design

Three subjects were recorded using the Video Diary System for five consecutive days. During the recording period, each subject wore an active badge and a tag which reminded other people at EuroPARC that they were being recorded. Some initial adjustments were made to the cameras located in each of the subject's offices to ensure that the captured images would include as much of the work area as possible.

Each subject was given a recall test after four different intervals: one day, one week, two-and-a-half weeks and four weeks. During each of the four recall tests, subjects were asked to recall their work activities of one of the previously recorded days, with a different day being recalled at each of the four recall sessions. At each recall session, subjects were asked to recall their activities under three different conditions. These conditions were always

presented in the following order for all subjects: (1) Free Recall condition, where the subjects used no external memory aids; (2) Pepys condition, where they were asked to recall additional activities while reading sequentially through their Pepys diary; and (3) Video Diary condition, where they were asked to recall additional activities while using the Video Diary System.

In the Video Diary condition, the experimenter started the Recorder Program, and the subject viewed the Video Diary from the start to the end of the day. The playback was set to show about three frames per second. This speed was judged by the subjects and the experimenter as being slow enough to allow changes in the scene to be viewed, but fast enough so that a day could be viewed within about 15-20 minutes. Subjects were allowed to stop and start playback at will, and were also allowed to "rewind" the video to have a closer look at a particular scene. In some cases, a portion of the video was studied in detail by stepping through the recording one frame at a time.

The recall sessions were audio taped, and later transcribed.

3.2. The Number of Activities Recalled

It should be pointed out that the results reported here are preliminary, and several cautions should be made before these results are interpreted. First, only three subjects were run in this experiment, and thus a fully counterbalanced design was not possible. Second, although an attempt was made to balance the days of recording, so that a different day was used for each recall interval across subjects, this proved to be impossible because of the need to juggle recall sessions to fit in with the subjects' busy work schedules. Third, there were some technical teething problems with both the infrastructure and the Video Diary System itself, so that some days of recording were cut short.

The measure of recall used was the number of activities mentioned during the recall sessions. Activities were scored for each condition by underlining phrases in the transcripts; activities included: conversations, meetings, reading documents, making telephone calls, etc. For the Pepys and Video Diary conditions, only new activities were counted; that is, any activity that had been recalled in an earlier condition was not scored. It should be pointed out that an activity was only scored as "recalled" if the subject provided enough content information to convince the experimenter that the activity was actually being remembered. Thus, for example, if the Video Diary showed the subject in conversation with another person, the subject was required to provide the experimenter with the general topic of the conversation, and not just report that the activity had occurred. This same criterion regarding content information was also used for scoring in the Free Recall and Pepys conditions.

The average number of recalled activities decreases as the length of the recall interval increases. In the Free Recall condition, the average number of activities recalled for the four recall intervals drops from about 15 recalled after one day, to just over two after four weeks. Averaged across all three conditions, the number of activities recalled drops from an average of 35 after one day, to 12 after four weeks. Thus, there is evidence that more activities are forgotten after longer recall intervals, although we have no control over the true number of activities that actually occurred on each of these days.

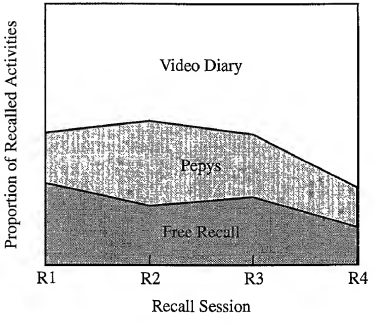

Figure 4. The proportion of activities recalled in each condition

A useful way to view the overall results from this experiment is to count the total number of activities that are recalled during each recall session summed over the three conditions. We can then look at the proportion of activities recalled in each condition. Figure 4 shows the proportion of the total number of activities recalled in each condition for the four recall sessions, averaged across the three subjects. It is clear that both the Pepys and the Video Diary conditions lead to the recall of additional activities; in other words, if Pepys and the Video Diary were not useful memory aids, we would expect to see a very small, or even non-existent, area representing the proportion of activities recalled in these conditions. In fact, more activities were recalled in the Video Diary condition than in either of the other two conditions; approximately half of the total number of activities were recalled in the Video Diary condition for the first three recall sessions, and nearly three-quarters of the total were recalled for the last recall session (after four weeks).

The Video Diary also served to confirm activities that had been recalled in the earlier Free Recall or Pepys conditions. For example, one subject recalled in the Free Recall condition that she had pinned notices on a noticeboard, and then later this activity was observed and confirmed in the Video Diary condition. There was often a tendency for the subjects to make confirming comments during the Video Diary condition; for example, "See, that's where I was doing ...", or "That's the conversation with ...".

Not only did the Video Diary condition confirm activities, it also occasionally disconfirmed activities that had been "recalled" in earlier conditions. For example, one subject commented in the Free Recall condition after two-and-a-half weeks, that her boss had phoned her to say he would not be in until lunchtime, and she said that this was cutting down on the time they would have available to get things ready for his business trip planned for the following day. Many of the activities recalled for this day hinged around this belief that her boss arrived late. However, when the Video Diary was viewed, and her boss appeared in the morning, she said:

> Oh, he came in much earlier than I thought he did—I thought it was lunchtime. It was this time [a later trip] that he came back from America he got in at lunchtime—it wasn't the time before when he got back from his holiday—he came back at the right time! So you see, you remember it wrong! So we had a whole morning together. Yeah, I got it wrong. You do forget, you forget.

Another subject recalled in the Free Recall condition a series of activities that centred around a telephone call informing him of a minor accident with his new car. But later in the Video Diary condition, he comments:

> No. I didn't do what I thought I did. Ah, I know why. Because I've got my days mixed up. What I thought was Friday the 13th wasn't Friday the 13th—So the set of events that I thought happened on Friday the 13th, didn't.

Thus, not only was the largest proportion of activities recalled in the Video Diary condition, but the Video Diary also proved useful in confirming and disconfirming other activities that had been recalled in earlier conditions.

3.3. Cues Used in Recall

Because we are interested in contextual information related to activities, we wanted to understand what aspects of the Video Diary were important in aiding the recall of activities. In other words, we wanted to determine what cues the subjects were using from the Video Diary to aid their recall. For each of the activities recalled in the Video Diary condition, the visual cues used were identified. It should be noted that the cues that were identified were those that the subjects made explicit in their recalls; there are almost certainly additional cues, some from the Video Diary and some generated by the subjects internally, which are implicit, and thus are not identified.

The two major classes of cues used were objects and people. For about half of the activities recalled in the Video Diary condition, a physical object served as a cue for the recall of the activity, and people served as cues for about one-third of the activities. In addition, the physical location of an activity was occasionally useful in aiding recall; for example, seeing oneself in the seminar room, cued the recall of attending a seminar on a particular topic. This location cue was also available to the subjects in the Pepys condition, since the Pepys diary provides location information (refer to Figure 1). Thus most of the activities involving changes in locations were recalled in the earlier Pepys condition, and were therefore not counted again as being recalled in the Video Diary condition.

Paper documents, books or folders were often commented on by the subjects in their recalls, as is shown in the following example where seeing an orange folder in her outbasket cued the recall of three separate conversations (the activities recalled are shown in italics):

> That was the folder of things I was giving to John. Ah, yeah, I remember some more things—*Mark came in because he wanted John to take—you know the staff satisfaction surveys with him to America*, and he left it with me and I said, "well, I'll ask him". And *he [John] said, "no, I won't—I've*

> *got enough paper to take,"* and made me give it back to him, or he gave it back to him I can't remember which. *Bill came up with a video,* which you'll see later, he'll come in and give me a video. I remember that. But all these things were things to go, in that orange folder... [these three activities are later confirmed in the Video Diary]

In other cases, both the presence of a person and a physical object served as recall cues. For example, after seeing a person and seeing a pad on which the subject was writing, she recalled:

> Peter—Yes, I do remember why he was there. Because *we were talking about the library system*—We're writing something—I've got a pad here and I was writing some stuff out, just deciding what to say—I was designing something with him.

Other objects that were used as cues included: workstations, telephones and cameras, as well as several other miscellaneous objects (including a plastic carrier bag from Waitrose!). In some cases, the object itself was being manipulated by the subject; for example, seeing himself on the telephone reminded one subject of a specific telephone conversation. One subject recalled, after being asked if he remembered who called:

> There may have been two phone calls, in fact. *One of them was Susan* who we'll be working with a few months early next year. In fact—*I think she phones back later on* [this is later confirmed in the Video Diary].

There are also examples where the lack of a certain object or person helped the subject decide about the content of an activity. For example, one subject recalled, after being asked if she knew why someone had come to her office:

> She—no, not on that occasion. I was thinking of an occasion when she asked me where some paper was, but I was talking to Joan—but Joan isn't there, so that's different.

This last excerpt is a good example of how contextual information can help people discriminate between a number of different conversations, a problem that was mentioned in the Introduction concerning the utility of the Pepys diary.

3.4. Location of Recalled Activities

We were also interested in knowing where most of the recalled activities occurred. One of the problems identified with the Pepys diary was the lack of detailed information about the activities that occurred in one's own office. Thus we wanted to know whether or not most of the additional activities recalled in the Video Diary condition occurred in one's own office, or in other places throughout the building.

It should be pointed out that we do not know the true number of activities that occur in different locations around the building. We do not know, for example, whether or not more activities occur in one's own office versus other people's offices or other areas of the building. Thus, although we can identify where the recalled activities occurred, we do not know what the proportion of recalled to true activities is for various locations. However, we

can still conclude that the Video Diary is useful in particular areas if there is an increase in the number of activities recalled in those areas in the Video Diary condition. What we cannot conclude is that the Video Diary is most useful in a particular location, because we do not know the true number of activities that occurred.

For each of the activities recalled in the Video Diary condition, the location of that activity was determined. About half of the activities recalled occurred in the subject's own office, about one-sixth occurred in other people's offices, and the remainder occurred in other more public areas. Thus nearly three-quarters of all the activities recalled occurred in offices, which are relatively private areas.

This finding is important for two other reasons. First, if a Video Diary System similar to the one described here is implemented at other sites, it may be easier and cheaper to have the system operate in only specific locations. Since many of the recalled activities occur in the subject's own office, even a scaled-down system where a camera only operates in an individual's own office will be useful. Second, having cameras in private places (e.g., offices) rather than in public places (e.g., common areas and reception areas) may be seen as more acceptable to other people in the building.

4. Conclusion

Although the evaluation described here is preliminary, we have clearly shown that a Video Diary can help people recall activities in their working lives. It is also useful in confirming and disconfirming what people think might have happened. The most frequently used cues are people and objects, and often the conjunction of these cues leads to the recall of new activities. Not surprisingly, a Video Diary helps the most after long periods of time, when the likelihood of recalling activities with no memory aids decreases.

It is important to note that even though the Video Diary has clearly been shown to increase the recall of work activities, it by no means completely captures the events of a working day. The inclusion of audio signals would undoubtedly improve one's ability to recall activities, for example, by revealing the content of conversations or meetings. Despite the problems with recording and playing back audio signals, there might be specific occasions where recording audio would be both acceptable and useful (e.g., formal meetings). In addition, capturing workstation activities would undoubtedly improve recall, since seeing oneself sitting at a workstation does not generally provide enough cues to completely reconstruct one's activities.

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PATENT APPLICATION

A Networked Peripheral for Visitor Greeting, Identification, Biographical Lookup and Tracking

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CROSS-REFERENCES TO RELATED APPLICATIONS

This application claims priority from U.S. Patent Application Serial No. 60/166,081, filed November 17, 1999, the entire disclosure of which is incorporated by reference.

BACKGROUND OF THE INVENTION

The present invention relates generally to techniques for automated information collection, and specifically to systems and apparatus for gathering information about visitors.

Everyday, in work places throughout the world, visitors are received at places of business, government agencies, real estate offices and so forth. The visitor is often greeted by a receptionist, who offers the visitor a sign-in sheet to record information about the visit. The visitor writes her name, place of business, person to be visited and the like in the sign-in sheet. In some cases, this information might be entered into a computer database manually by a receptionist or a security officer. Such information is typically used for security purposes. Sometimes, the visitor will be issued a guest pass, or identity badge to announce her presence. The receptionist often notifies the person to be visited that the visitor has arrived. These activities occur so often that they have become part of the culture in the U.S. and many other countries as well.

Opportunities for improving techniques for gathering information about visitors exist. Since the entry point to an office is one place where people are required to identify themselves, valuable data about the visitor can be readily gathered at this point.

What is needed are improved techniques for automating the collecting of information about visitors.

SUMMARY OF THE INVENTION

The present invention provides techniques for collecting information about visitors. In one embodiment, the present invention provides a visitor kiosk system for the greeting, identification, biographical lookup, and tracking of visitors to a facility. The visitor

kiosk is placed at the entry point of the facility being monitored. Each visitor to the facility "signs-in" at the kiosk. The visitor's business card is scanned, and an image of the visitor is obtained. If the visitor does not have a business card, the visitor's name and company name can be entered manually. In specific embodments, the visitor's speech is also recorded. The visitor also enters a name of a person to be visited and a purpose for the visit. The person to be visited is notified of the arrival of the visitor by email or by voice telephone. The data about the visitor can be stored locally or remotely. Automatic lookups of various kinds of information about the visitor are performed and communicated to the person being visited. A network interface allows users to enter information about visitors they are expecting to arrive, as well as to make notes about the visit after the visitor leaves. A telephone interface provides the capability to input voice messages, as well as check the status of visitors.

In a representative embodiment according to the present invention, a visitor information gathering apparatus is provided. The apparatus can be embodied as a kiosk that comprises a display; one or more input devices; a storage; a processor; and one or more sensors. The processor captures information about visitors from inputs to the input devices made responsive to prompts provided by the processor through the display, as well as information obtained from the sensors. Then, the processor stores the information about the visitors. In specific embodiments, the input devices can be any of a touch screen, a keyboard, a mouse, trackball, touch pad, a combination thereof, or other types of input devices. The apparatus may display a greeting on the display. The greeting can be customized to the interests of visitors, and can include a slide show of product images, advertising, stock values, daily cartoons, and news, for example. The sensors can include any of a business card scanner, a microphone, a video camera, a speaker, a docking station for obtaining information from one or more visitor wands, a handwriting tablet, one or more biological or biometric sensors, and/or one or more security sensors. The information about the visitors includes one or more of a name, an organization represented by the visitor, a purpose of a visit, a date and/or time of the visit, a person to be visited, and an identity of a group visiting together. Furthermore, other kinds of information can be provided by the sensors attached to the apparatus. For example, the microphone can record a sample of the visitor's speech, the video camera can record images of the visitor, the handwriting tablet can record the visitor's signature. Some information about the visitor is gathered from the sensors without the visitor being aware of the gathering. This is referred to as "unconscious capture" herein. Other information is gathered from the visitor with the visitor's knowledge and awareness. This

type of information gathering is referred to as "conscious capture." These terms are not intended to be limiting.

In certain specific embodiments, various types of interfaces can connect the kiosk to users of information. For example, a telephony interface can provide telephone connections via the public switched telephone network. One or more network interfaces can connect the kiosk to one or more networks for communications. A public server can be communicated with using the connection to the network and network interface, for example. Further, a local server can connect one or more kiosks to one or more users of information using a local area network (LAN), for example. The local server provides a storage place for holding information about visitors.

In a specific embodiment, the business card scanner scans one or both sides of a business card having printing on one or both sides. Then, if the computer detects the presence of text on one or both sides, it processes the text in accordance with the language of the text. The text is processed using an OCR software in a particular embodiment.

In another representative embodiment according to the present invention, a method for collecting information about visitors is provided. The method can comprise a variety of elements, such as for example, gathering information about the visitors in an interactive session with an automated kiosk. Placing the information into a format in which the information may be stored is also part of the method. The method includes storing the information for retrieval. Storage is done either locally, or remotely is specific embodiments. Automatically obtaining information about the visitor from one or more sources and providing the information about the visitor is also part of the method. The information gathered at the kiosk can be provided to persons interested in the information. In specific embodiments, the obtaining information about the visitor from one or more sources can be one or more of performing a search on the Internet, searching a publicly available database, searching a database of visitor information obtained from the kiosk, searching a local database, as well as others. Further, in some specific embodiments, the obtaining information can include sensing information about the visitor without said visitor's awareness (unconscious capture), as well as obtaining information about the visitor with prompts and the like, of which the visitor is aware (conscious capture).

In a further representative embodiment according to the present invention, a system for tracking activity within a facility is provided. The system can comprise a plurality of locator apparatuses; a network, interconnecting the plurality of locator apparatuses; and one or more portable visitor wands. The portable visitor wands communicate an identity of

an associated visitor to one or more locator apparatuses, and the locator apparatuses track position of a visitor based upon the communicated identities. In specific embodiments, the visitor wands can be handheld wand like apparatuses, personal data assistants (PDAs), active badges, portable telephone like apparatuses, and the like. The communication link between the locator apparatuses and the visitor wands can be any of an infrared communication link, a radio communication link, an optical communication link, sensing a magnetic card, a telephone communication link, a pager communication link, or a Bluetooth™ communication link. Bluetooth™ is a wireless protocol standard developed by the Bluetooth™ Special Interest Group. (see, e.g., www.bluetooth.com).

In specific embodiments, one or more logs are created that record the exchange of identifies communicated from the visitor wands to the locator apparatuses. One type of log, called a "personal history" provides a record of the locator apparatuses visited by a particular visitor. Another type of log, called a "location hsitory" provides a record of the visitors who visited a particular locator apparatus.

In a yet further representative embodiment, the present invention provides an apparatus for automatically populating a database. The apparatus comprises a display; one or more input devices; a storage; and a processor. The processor captures information from the input devices. This information is entered by the visitor responsive to prompts provided by the processor through the display. The processor stores the information about visitors into the storage. The information includes personnel information that may be used to annotate documents is a specific embodiment. Further, in certain specific embodiments, the personnel information is used to replace one or more names by hypertext links to the personnel information.

In a still yet further representative embodiment, a method for providing an image is provded. The method comprises automatically capturing one or more images of a person. The method also includes providing to the person the images so captured. Receiving from the person an indication of a preferred image that is selected from among the images is also part of the method.

Numerous benefits are achieved by way of the present invention over conventional techniques. The present invention can provide automated techniques for gathering, organizing, retrieving and archiving information about visitors. Specific embodiments can capture information about a visitor and the visit either with (conscious capture) or without (unconscious capture) the visitor's knowledge.

These and other benefits are described throughout the present specification. A further understanding of the nature and advantages of the invention herein may be realized by reference to the remaining portions of the specification and the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 illustrates a schematic diagram of a representative visitor greeting and information collecting kiosk in a specific embodiment according to the present invention;

Fig. 2 illustrates a block diagram of a representative visitor greeting and information collecting apparatus in a specific embodiment according to the present invention;

Figs. 3A-3C illustrate representative visitor wands in various specific embodiments according to the present invention;

Fig. 4 illustrates a block diagram of a representative hardware implementation for a visitor wand in a specific embodiment according to the present invention;

Fig. 5 illustrates a representative flowchart of processing visitor information in a specific embodiment according to the present invention;

Figs. 6A-6M illustrate representative screens displayed during a representative greeting session with a specific embodiment according to the present invention;

Fig. 7 illustrates a representative example of visitor wand tracking in a specific embodiment according to the present invention; and

Fig. 8 illustrates a representative HTML description of a visitor instance in a specific embodiment according to the present invention.

DESCRIPTION OF THE SPECIFIC EMBODIMENTS

The present invention provides techniques for the capture and storage of personal information about visitors. In a presently preferred embodiment, the invention provides an interactive visitor kiosk that is placed at the entry point of a facility. Each visitor to the facility is invited to "sign-in" at the kiosk. During the sign-in process, the kiosk collects certain information about the visitor and her visit. The visitor's business card is scanned, and an image of the visitor is obtained. If the visitor does not have a business card, the visitor's name and company name can be entered manually. In specific embodments, the visitor's speech is also recorded. The visitor also enters a name of a person to be visited and a purpose for the visit. The person to be visited is notified of the arrival of the visitor by email or by voice telephone. The data about the visitor can be stored locally and/or remotely.

A variety of information about the visitor is searched for automatically, and the results communicated to the person being visited. A network interface allows users at the facility to enter information about visitors they are expecting. A telephone interface provides a mechanism to input voice greetings as well as checking on the arrival status of visitors.

Fig. 1 illustrates a representative visitor kiosk in a specific embodiment according to the present invention. Fig. 1 shows a visitor welcome area 10 that includes a stationary visitor kiosk 100, and a plurality of portable greeting devices 300, also known as "visitor wands." The present invention provides a variety of embodiments that implement the visitor kiosk 100. Different specific embodiments can provide a variety of capabilities depending upon the configuration of components and processes that comprise the embodiment. The visitor kiosk 100 is preferably implemented using a computer, such as a personal computer (PC). The computer can have a touch screen, for example, and/or a keyboard or keypad to enable visitors to enter information. However, other input devices, such as touch pads, track devices, joy sticks, mouse and the like can also be used in various specific embodiments according to the present invention. The use of buttons on the touch screen can obviate the need for a keyboard and the like in certain applications. However, in other applications, the visitor kiosk 100 can also include a keyboard.

The user interface of the visitor kiosk 100 can use any of a plurality of different languages to communicate with the visitor. The visitor can choose a preferred language at the initial login screen. Prompts in the user interface can be supplemented with spoken directions. Music can be added to improve the visitor's experience, especially if the visitor must wait for the person to be visited. The user interface of the visitor kiosk 100 can capture the name of the visitor, the organization they represent, the purpose for their visit, and related events, such as for example, that the visitor is also in the United States to attend Comdex™. The date and time of the visit and the person to be visited can be entered manually or chosen from a list. Whether the visitor is alone, or a member of a group visiting together can also be collected by the visitor kiosk 100.

The user interface can display a greeting for visitors to view. Greetings can include a variety of types of information, such as a slide show of images or products, advertisements, updated stock values, and daily cartoons, for example. Information can be selected according to local preferences and varied depending upon the nature of the facility and the anticipated preferences of the audience. In specific embodiments, the date of a visitor's most recent previous visit is incorporated into the greeting for that visitor. The data about the visitor's prior visits can be saved locally by the visitor kiosk computer 100 in order

to prepare this type of greeting for visitors. Also, this data can be used to output a log of all visits during a given time period. Such requests can be searched by a range of dates, times, company names, persons to be visited, and the like, for example.

Fig. 2 illustrates a block diagram of a representative visitor greeting and information collecting apparatus in a specific embodiment according to the present invention. Fig. 2 illustrates various components and interfaces of the visitor kiosk 100 of Fig. 1. Fig. 2 illustrates representative visitor kiosk 100 integrated into a visitor information system. The visitor kiosk 100 is enclosed by a dashed line in Fig. 2. Visitor kiosk 100 includes a computer 202 connected with a variety of sensors, input/output devices, and interfaces. For example, computer 202 exchanges information with a microphone 204, a video camera 206, a speaker 208, a docking station for visitor wands 210, a handwriting tablet 212, one or more biological or biometric sensors 214, and a business card scanner 216. Some specific embodiments include a subset of these components, while other specific embodiments can include elements other than those depicted in Fig. 2. Also, kiosk 100 can include various devices that are not shown by Fig. 2, such as, for example a computer touch screen, an optional keyboard, a mouse, trackball, touch pad, a combination thereof, or other types of input devices can be incorporated into kiosk 100.

The microphone 204 captures samples of the visitor's speech. This can be done without the visitor's knowledge, which is known as "unconscious capture." Alternatively, the visitor's speech is sampled after obtaining prior permission, in which case the audio capture capability of microphone 204 is activated after asking for, and receiving, the visitor's permission. Microphone 204 can capture anything the visitor might say while standing near the kiosk. In specific embodiments using conscious capture, the visitor is asked to "Please say your name," for example. The recorded audio can be forwarded to the person being visited, in order to help identify the visitor. The audio data can also be saved and used as training data for other algorithms that can identify speakers in unlabeled audio tracks or to recognize the words that the visitor spoke. For further description of techniques for identifying individuals based upon audio data, reference may be had to a U.S. Patent Serial No. 5,946,654, issued to M.J. Newman, L.S. Gillick, and Y. Ito, entitled, "Speaker identification using unsupervised speech models," which is incorporated herein by reference in its entirety for all purposes.

Video camera 206 provides interactive information gathering with the visitor. For example, the visitor can be asked whether she would like her picture taken. If the visitor responds in the affirmative, she poses in front of the camera and presses a "Take" button

when she is ready for the system to capture her picture. In some embodiments, the camera captures a short video clip. The clip can be captured in a time window around the time when the "Take" button is pushed, for example. A "best," i.e., most web-framed single frame from the clip, can be chosen to represent the visitor. In alternative embodiments, the video capture is performed without the visitor's awareness. This is known as "unconscious capture." Embodiments employing unconscious capture obviate the need for a "Take" button. Further, such embodiments capture an image of each visitor that signs-in at the kiosk. A video clip can be captured starting when the visitor first started logging in until shortly after they were finished, for example. Both the clip and the best single frame from the clip can be saved.

In specific embodiments, more than one camera is used in order to capture images of the visitor from different perspectives. For example, one of the cameras can be aimed to grab a frontal view full-face image. Other cameras can be deployed in the area nearby the kiosk and can be aimed to gather clips of the visitor viewed from different angles. A wide angle view taken from a location that is a known distance from the visitor enables the system to determine the visitor's height. The video clips can be used later to help identify the visitor in other environments. If the clips show the visitor walking across the room, the visitor can be identified using known techniques that demonstrate how people are often identifiable from a combination of their height, body shape, posture, and gait. For further description of techniques for identifying individuals based upon these features, reference may be had to a publication by D. Cunado, J.M. Nash, M.S. Nixon, and J.N. Carter, entitled, "Gait extraction and description by evidence gathering," Proceedings of the Second International Conference on Audio and Video-based Person Identification, Washington, D.C., March 22-23, 1999, 43-48, which is incorporated herein by reference in its entirety for all purposes.

In a specific embodiment, a plurality of close-up images of a visitor are combined to generate a three-dimensional representation for the visitor. One specific embodiment employs a software product of Avatarme, Ltd. (www.avatar.com) to generate a three-dimensional representation of the visitor that can be used to identify the visitor later in other environments.

The information captured by the visitor kiosk can be used to identify the visitor at other office appliances. This provides automatic identification for visitors at devices using unconscious capture. In specific embodiments, once the visitor kiosk supplies information about a visitor to other devices in the facility, these devices can draw upon this information later to identify the visitor. Thus, according to an embodiment of the present invention, a copy machine in the facility can recognize that a specific visitor is requesting

copy services based upon the identification information gathered about the visitor at the visitor kiosk. The visitor kiosk can combine information about a particular visitor's authorization to use certain devices to the networked machines in the facility. These machines, upon recognizing the visitor, will determine whether the visitor is permitted to access that particular machine.

The speaker 208 can enable the kiosk to play pre-recorded greetings. These can be generic greetings like, "Welcome to the Ricoh California Research Center," or they can be tailored to individual visitors. For example, after scanning a business card for Mr. X, the kiosk can greet the recognized visitor with, "Welcome to Our Company, Mr. X." In specific embodiments, instructions for a visitor are read aloud. A computer synthesized voice, which can be provided by "DECtalk," a product of Digital Equipment Corporation, for example, or by pre-recorded audio clips, can be used to provide the speech. The kiosk 100 can also play music before or after a visitor signs in or at different points during the sign-in process.

The docking station for visitor wands 210 provides a connection to visitor wands 300. Visitor wands can be used as identity badges, for example. Each visitor can be provided with a visitor wand and invited to carry it while visiting the facility. In specific embodiments, the visitor wand can record the visitor's location, who the visitor meets with, and what is said during those meetings. This information can be compiled into a "visitor's diary," a record of the visitor's experience at the facility. The docking station for visitor wands 210 provides information about the times when wands are removed and replaced. In conjunction with the user interface software of the visitor kiosk, the identity of the visitor possessing each particular visitor wand is tracked. The docking station also provides a mechanism for downloading data to and uploading data from a visitor wand. Visitor wands will be described in further detail herein below with reference to Figs. 3A-3C.

Handwritting tablet 212 captures the signature of the visitor at the kiosk, acting as a replacement for the sign-in sheet of conventional receptionists. The visitor is prompted by the user interface to write her signature on the tablet. Preferably, a pressure-sensitive tablet is used. However, other types of writing tablets are used in various specific embodiments. The handwriting tablet captures the sample of the visitor's signature to enable accurate verification of the visitor's signature subsequent to the visit. For a detailed description of techniques for identifying individuals based upon handwriting, reference may be had to a publication by R. Plamondon and G. Lorette, entitled, "Automatic signature

verification: The state of the art," Pattern Recognition, 22, no.2, 107-131, 1989, which is incorporated herein by reference in its entirety for all purposes.

Biological and biometric sensors 214 interfaced to the kiosk computer 202 provide data that can be used for subsequent biometric identification of the visitor. Biological and biometric sensors 214 collect information associated with a person's body functions, such as a persons weight, a body temperature, a heart rate, a respiratory rate, one or more fingerprints, and an odor. In a specific embodiment, weight is measured using a pad in front of the kiosk. Fingerprints are read through a special mouse, space bar on the keyboard, or touch screen. For a detailed description of techniques for measuring weight, reference may be had to a publication by M.D. Addlesee, A.H. Jones, F. Livesey, and E.S. Samaria, entitled, "The ORL Active Floor," IEEE Personal Communications, Vol.4, No.5, October 1997, pp. 35-41 (ftp://ftp.uk.research.att.com:/pub/docs/att'tr.97.11.pdf), which is incorporated herein by reference in its entirety for all purposes.

In specific embodiments, biometric identification and/or visitor wand identification is used to identify the visitor's presence at a networked office machine, such as a copier, printer, facsimile machine, or the like. Visitors with permission to use the machine are recognized by comparing the visitor's biometric information with a known biometric "signature" for the visitor and authorization information gathered by the visitor kiosk 100. Unconsciously captured images of the documents the visitor processes with the office machine can be sent to the visitor at the end of the visit.

The emotional state of the visitor can be recognized from a combination of biological measurements. Techniques for inferring an emotional state from biological measurements are known in the art. The visitor's emotional state can be determined, and the results communicated to the persons being visited. This information can assist persons being visited in responding to unspoken needs of the visitor. For example, someone who is nervous because she is worried about something at home might enjoy an opportunity to make a telephone call. Accordingly, knowing the visitor's emotional state enables persons at the facility to take action to reassure the visitor.

The business card scanner 216 interfaces to the kiosk computer 202 and resides proximately with the visitor kiosk 100. Event-based software within the user interface of kiosk computer 202 controls the operation of the business card scanner 216. At an appropriate time while interacting with a visitor, the visitor inserts her business card into the scanner. This is detected and the scanner's operation is started. An image of the business card is obtained and saved. An optical character recognition (OCR) program is applied to the

image either locally by the kiosk computer or remotely at the server 22. The result of the OCR is displayed to the visitor by the interface software of kiosk computer 202. Fields such as the visitor's name are detected by the OCR and used by the user interface to address the visitor. Visitors can be asked to confirm the OCR results with a prompt on the display screen, or through a voice message, or the like. In specific embodiments, a two-sided business card scanner is used. These embodiments provide the capability to input information from foreign language business cards, such as for example, those used in Japan, in which English and Japanese text appear on opposite sides of the business card. The OCR software can detect which language is present and automatically apply the appropriate algorithms.

A variety of interfaces can connect the kiosk 100 to computer systems, networks, and the like, in order to provide information to persons in the facility. A local network interface 220 enables communication between the kiosk 100 and client computers and other devices on the local network 20, which can be a local area network (LAN), for example. The local network interface 220 connects kiosk 100 to a private server 22 via the local network 20, for example. The private server 22 can be a company internal use only computer accessible only to employees within the facility, for example. Private server 22 provides a convenient place to store information about visitors, which has been gathered from one or more kiosks deployed in one or more facilities. A browser (not shown) can access the visitor information on the server 22. A variety of devices (not shown) can communicate with kiosk 100 via network 20, such as a networked copier, such as the eCabinet product by Ricoh, facsimile machines, computers, and the like, for example.

A network interface 222 connects the kiosk 100 to a publically accessible network 30 for communications with the public. The network interface 222 provides communications between the kiosk 100 and publically accessible resources, such as sites on the world wide web. A public server 32 is connected to kiosk computer 202 via the network 30, network interface 222, and a firewall software application (not shown) to provide the public access to specific information about the visitors and/or the facility, for example. A web browser (not shown) can provide the interface to this information.

A telephony interface 224 provides a telephone connection via the public switched telephone network (PSTN or POTS). The telephony interface 224 provides the capability to persons within the facility to provide information to, and receive information from, the kiosk 100 by telephone.

Network accessibility provides a variety of advantages in specific embodiments. For example, in one specific embodiment, a feed from the video camera at the kiosk is displayed on a computer monitor (not shown) of someone who expects a visitor. The computer monitor is interfaced to the kiosk computer 202 via the network 20, for example. Persons expecting a visitor can view the area around the kiosk for the arrival of the visitor. This enables persons at the facility to greet the visitor as soon as the visitor approaches the kiosk, thereby providing a personalized greeting, if so desired. A client monitor (not shown) can provide a real time indication of activity taking place at the keyboard and/or touch screen of the kiosk computer 202. The client monitor can include a live audio feed from the microphone 204 at the kiosk 100. In specific embodiments, the microphone 204 provides the audio feed without the visitor being aware of its operation (unconscious capture).

Many kinds of system maintenance and updating functions are enabled by the network interface. In a specific embodiment, once a visitor signs-in at the kiosk, a communication is entered into between kiosk computer 202 and server 22. In this specific embodiment, the communication is implemented using a Unix socket that is opened to a process on the server 22. Then, the kiosk computer 202 sends a message that indicates to the server 22 that a new visitor has arrived. Responsive to this message, a process on the server 22 opens an ftp connection, for example, to the kiosk computer 202 and obtains copies of the files associated with the newly arrived visitor. These files can include for example a business card image, a result of processing the business card imae using an OCR, text data, a sound file, a video clip, and the like. The kiosk computer 202 can also respond to status requests made by server 22 over network 20, for example. The kiosk computer 202 tracks its performance using a variety of statistical measures, such as a date program started, a number of visitors, a date of last visitor logged in, and the like. In specific embodiments, statistical moments such as mean, mode, average, standard deviation, kurtosis, and the like, known in the art track numbers of visitors, their arrival times, and the like. Then, upon request by server 22, which may be made using a socket call, for example, the kiosk computer 202 sends a list of logged events and/or statistics to the requester. The server 22 can verify that the kiosk 100 has been operating normally by analyzing the statistics sent to it by kiosk computer 202.

In a specific embodiment, the kiosk computer 202 sends email messages over the network 20. These email messages can notify persons connected to the network 20 that a visitor has arrived. These persons can identify the visitor by the email messages. Attachments such as the sound, video, and/or still images of the visitor can be appended to

the emails to assist in recognizing the visitor. The kiosk computer 202 also receives email messages, which it processes as commands. For example, an email message sent to a visitor kiosk 100 at the address "kiosk@crc.ricoh.com" having "SHOW VISITORS" in the subject line will cause the kiosk to return a list of visitors and the dates that the visitors signed in at the kiosk 100. The kiosk 100 can also receive notifications of visitors to expect in this way. For example, an email message with, "VISITOR 8/22/1999 Masamitsu Sakurai," informs the kiosk computer 202 that this person is expected on August 22. In a specific embodiment, this information is used by the kiosk to post-process the results of applying OCR software to an image obtained by scanning the visitor's business card. Further, in specific embodiments, the information from the notification is used to populate the user interface. A pull-down menu, for example, is populated with the names of visitors that the kiosk has been notified to expect. When one of the visitors arrives, she can select her name from the pull-down menu. Information about expected visitors can also be used to notify persons expecting a visitor that a particular visitor did not arrive. The user interface can also be modified based on expected visitors. For example, if a visitor from a prominent company, X, is expected, photographs can be displayed on the screen that highlight the facility's relationship with company X.

In a specific embodiment, the kiosk computer 202 comprises a web server program, providing a stand-alone visitor information collection system on the network 20. In this configuration, kiosk computer 202 maintains a home page that shows the visitors processed by the kiosk 100, as well as the person(s) visited. Users can query this information based upon parameters such as a visitor name, a host name, a date or a date range, a purpose, and an associated event. For example "show me all the visitors in July who were here for the review meeting," may be submitted as a query of the information stored by the visitor kiosk 100. In one embodiment, a CGI script can be executed by the kiosk computer 202 in order to retrieve the appropriate data and display it as a web page. Expected visitors can be entered with a CGI script at the web server 22. A forms interface can allow visitors to enter the date, name, organization, phone numbers, email address, purpose for visit, expected time of arrival, and agenda. This can include the names of people in the facility and times when the visitor will meet with each one.

The network interface 222 provides connection to the world wide web via external network 30. In specific embodiments, personal information about the visitor can be gathered automatically from the world wide web. For example, a person to be visited may desire to research conversation topics of interest to the visitor. The weather during the previous few days or weeks in the town that the visitor came from, standings and recent

results for the home sports teams, and the like, can be retrieved to form a "biographical profile" that can serve as a basis for conversation with the visitor. Recent cultural events, such as theatre, and the like, in the visitor's home towns can also be retrieved. Popular Internet sites, such as YAHOO™, for example, provide sources from which this data might be extracted. The weather during the visitor's previous visit, as well as a list of significant news stories at that time might be provided if the visitor is making a return visit to the facility. This information can be transmitted to the person to be visited via an email message before the visitor is scheduled to arrive.

The compilation of biographical information can also include security related information, which may be useful in cases where the visitor has not previously visited the facility. For example, searching online newspapers for the visitor's name can answer a plurality of security related questions. Did the visitor recently write a letter to the Editor? Was the visitor arrested recently? Is the visitor on the FBI's ten most-wanted list? Should Security be alerted? Newspapers in the town where the visitor is from can be searched for recent locally significant news stories. Further, one or more databases can be searched for the visitor's name. These databases include readily available archives of genealogy information, ham radio licensees, aircraft pilots, department of motor vehicles (DMV) data, such as driver's licenses and registrations, voter registration, property ownership and tax roles and various criminal registries.

Visitor information obtained from the world wide web and other external sources can be augmented with information stored in a database residing on server 22, or directly on the kiosk computer 202, about the visitor's personal interests. This information can also be entered with an "expected visitor" web form. For example, information about the kind of car a visitor drives, the visitors hobbies (e.g., golf), what the visitor likes to eat, and where the visitor was taken to lunch or dinner during the previous visit can be incorporated into the biographical profile of the visitor. This can be compared with an online restaurant guide to determine suggested resturants to take the visitor during her stay. A history of the visitor's hotel stays can be used to suggest where the visitor should be housed.

The public server 32 that is connected to publically accessible communciation network 30 enables the world wide web to be used as a focal point for follow-up communication with visitors. As described herein above, a visitor is assigned a web page upon visiting the facility. Each time the visitor comes to the facility, the web page is updated with a record of the most recent visit. Information such as whom the visitor met with, (with or without images), meeting notes, and the like, is posted on the visitor's web page. Other

information could also be included, such as for example, what the weather was like the day of the visitor's last visit, what the headlines were, and the like. In addition, any technical reports or literature that the visitor received during the visit can be posted to the web page. In embodiments employing an extranet, a person inside the company can securely share selected information with a customer by posting the information to that customer's web page. This can be useful beyond mere face-to-face visits, and can be extended to cover any ongoing relationship, even if initiated via email or telephone. Specific embodiments can provide the persons being visited with a mechanism to control distribution of information by tracking whom they met with and what was discussed. Further, specific embodiments can assist the forgetful visitor with remembering what was discussed in meetings held during the visit.

The telephony interface 224 provides the capability to contact visitors and persons to be visited by telephone. When a visitor registers at the kiosk and indicates who they are visiting, the person to be visited can be contacted by telephone. The kiosk notifies them that a visitor has arrived. If the person to be visited does not answer, a designated alternate is telephoned. The kiosk plays a pre-recorded message to the person to be visited or the alternate. If the name of the visitor is available (from the business card OCR results or if it was manually entered), it can be incorporated into the message by a speech synthesizer. The telephony interface also enables the kiosk to act as a speakerphone. If the person to be visited answers the telephone call from the kiosk, a connection is opened with the visitor. This allows the host to greet the visitor and let the visitor know that the host will arrive at the kiosk shortly to escort the visitor in the facility. A video link can also be added to the interface to make this communication a video conference.

In some embodiments, the kiosk 100 also receives telephone calls via telephony interface 224. In these embodiments, the kiosk 100 is equipped with a touch tone interface that enables the caller to execute various options. One option is to check the status of expected visitors. Another option is to leave a voice message for an expected visitor, which can be played when the visitor arrives. The host for a visitor can be changed and an expected visitor can be added or deleted using a touch tone interface.

In specific embodiments, security devices (not shown), such as a metal detector or an explosives detector can be incorporated to the kiosk. These embodiments can provide greater security to persons working in secure areas. In a specific embodiment, a detector for RF transmission or reception can detect the presence of listening devices on the visitor. A detailed description of various examples of commercially available sensors useful

in creating certain specific embodiments may be had by referring to, "The Spy Store" (http://www.thespystore.com).

In specific embodiments, a printer (not shown) interfaces with visitor kiosk 100. In certain specific embodiments, the visitor receives a printed "receipt" from the printer after signing in with the kiosk. The receipt can include a URL assigned uniquely to the visitor. The URL points to the web page created for the the visitor, which can be located on the public server 32. The web page provides a place to access information collected about the visitor and the visit. Other potentially useful information can be printed on the "receipt," such as what has changed since the visitor's last trip to the facility.

The operation of these and other components of specific embodiments according to the present invention will be discussed in greater detail below. In various specific embodiments, not all of these components will be present. Yet further, in many embodiments, other components can be included. These modifications will be readily apparent to those of ordinary skill in the art.

Fig. 3A illustrates a visitor wand in a specific embodiment according to the present invention. Visitor wand 300 illustrated in Fig. 3A is embodied as a hand held device having a display area 302 for providing messages to the visitor and displaying to the visitor entries made using a keypad 304. In the embodiment illustrated in Fig. 3A, the keypad 304 comprises a "qwerty" style key arrangement. However, other arrangements, including subsets and supersets of the "qwerty" key layout, are used in other specific embodiments. A hand grip 306 provides comfortable contour to the visitor's hand. A video camera 310 is incorporated into the wand in certain embodiments. A plurality of biometric sensors 312a and 312b can detect biological information about the visitor, such as heart rate and the like. Visitor wand 300 can guide the visitor in the facility. An itinerary for the visitor can be stored on visitor wand 300 prior to the visitor's arrival. The visitor wand 300 then displays the itinerary together with directions for the visitor at specific intervals during the day. For example, at 10:00AM, visitor wand 300 might display the message, "take the elevator to the fourth floor, turn right, walk 50 feet to room 561." An alternative is to display directions graphically using a map.

The visitor wand 300 further comprises an audio recorder. A microphone 308 and audio recording circuitry (not shown) provide the capability to save a copy of notes from meetings that the visitor attends as she travels through the facility. Recorded information can be stored in the wand 300. The recordings can be parameterized by the identity of the persons to be visited, computed as described above. This allows easy retrieval later, either by

the visitor or the person to be visited. For example, the visitor may wish to make queries like "please retrieve the conversation I had with Ms. X on August 9."

The video camera 310 is incorporated into the wand 300 in order to record the visitor's activities and experiences while at the facility. Its record can be supplemented with still images or video clips captured from other cameras in the facility. For example, an image from the camera in a particular room can be captured and saved on the wand, or alternatively on a server, when the visitor is in that room. For a detailed description of a technique for capturing video recordings, reference may be had to a publication by M. Eldridge, M. Lamming, and M. Flynn, entitled, "Does a Video Diary Help Recall?" Technical Report EPC-1991-124, published in People and Computers VII, A. Monk et. al. (ed.), Cambridge University Press, 1992, pp. 257-269.

Biological sensors 312a and 312b detect heart rate, heat, odor, and the like. These sensors can help identify the wand user and help detect if a wand is passed from one person to another. Sensors 312a and 312b can also detect biometric data from which the emotional state of the visitor can be determined. This information can assist persons at the facility in improving the experience of the visitor. For example, a visitor who is determined to be excessively nervous can be offered a cup of herbal tea.

In specific embodiments, an inertial sensor (not shown) can be incorporated into the wand. For a detailed description of techniques for sensing inertia, reference may be had to a publication by Marc A. Viredaz, entitled "The Itsy Pocket Computer Version 1.5: User's Manual," Technical Note TN-54, Compaq Western Research Laboratory, July 1998, which is incorporated herein by reference in its entirety for all purposes. It can indicate when the wand was stationary for long periods of time. This might indicate the visitor removed it from his person.

In specific embodiments, visitor wand 300 maintains a wireless communication with one or more transceivers located in the facility using an antenna 316 coupled to internal communications circuitry (not shown). Visitor wand 300 can comprise circuitry (not shown) that enables it to determine a distance to other transceivers in the facility. The facility is equipped with a multiplicity of fixed transceivers, from which the wand 300 determines its position by triangulation. This positional information is also transmitted by the fixed transceivers to a common point, such as kiosk 100, which serves as a "base" station.

The microphone 308, speaker 314, antenna 316, and associated circuitry (not shown) provide telephone functionality to the wand. A visitor can contact a person to be

visited using the telephone by scrolling a cursor to the person's name in the display 302 and pressing a button in keypad 304. The visitor wand establishes a telephone connection with the selected person. Similarly, a person to be visited can contact a visitor by calling the phone number of the wand that the visitor was issued. This number is recorded by the kiosk computer 202 and communicated to the person to be visited listed in the visitor's itinerary. The number can be posted on a web page accessible using the network 20, as well.

Fig. 3B illustrates a representative visitor wand in an alternative embodiment according to the present invention. Visitor wand 320 illustrated in Fig. 3B is embodied as a hand held appliance having cellular telephone communications capability. Wand 320 has a display area 322 for providing messages to the visitor and displaying to the visitor entries made on a keypad 324. In the embodiment illustrated in Fig. 3B, the keypad 324 comprises an alphameric style key arrangement. However, other arrangements including subsets and supersets of a standard "qwerty" key layout are used in other specific embodiments. A microphone 328, a speaker 334, and audio recording circuitry (not shown) provide audio input and output capability. The microphone 328, speaker 334 and an antenna 336 also provide telephone access via the wand. A video camera 330 can be incorporated into this embodiment, as well. A plurality of biometric sensors 332a and 332b can detect biological information about the visitor, such as heart rate and the like.

Fig. 3C illustrates a representative visitor wand in a further alternative embodiment according to the present invention. The visitor wand 340 of Fig. 3C is embodied as a personal data assistant (PDA) style device. The wand 340 comprises a digital writing pad 344 with which visitors can input data, such as notes, for example. The notes can be stored in memory of the wand 340 for later retrieval. Wand 340 has a display area 342 for providing messages to the visitor and displaying to the visitor the entries made on the writing pad 344. A microphone 348, a speaker 354, and audio recording circuitry (not shown) provide audio input and output capability. The microphone 348, speaker 354 and an antenna 336 provide telephone access via the wand. A video camera 350 can be incorporated into this embodiment, as well. A plurality of biometric sensors 352a and 352b can detect biological information about the visitor, such as heart rate and the like.

A record of whom a visitor meets with can be compiled using a triangulation technique in conjunction with a fixed physical position of persons visited. The physical position of a person can be determined from an accurate mapping between an assumed and an actual physical position of persons to be visited. This mapping can be determined from an office layout, or the like. For example, a person "A" holding a particular visitor wand, who is

in the facility to visit person "B," will be located by the signal from a visitor wand in close proximity to the office of person "B." Another option is to require persons to be visited to carry a transceiver similar to a visitor wand. In this case, the person to be visited can be assumed to be the person with the wand that is physically closest to the visitor.

Microphones in the facility, not attached to the wand, can supplement the visitor wand's recording capability. These extra microphones can be attached to the fixed transceivers described above, or through some other connection. In one configuration, the wand transmits its position and the audio signal it is recording to a base station. The base station also receives audio input from other microphones in the facility. The base station determines which microphones are "active" given the physical position of the wand. The audio from each such active microphone is captured and savend. Alternatively, the audio from the microphone with a highest audio level is saved. Audio signals from multiple microphones can also be compared to verify the choice of a non-wand microphone, whenever a reduced amplitude signal from a non-wand microphone is present in the background of the sound recorded on the wand microphone. An alternative to choosing one audio track is to save more than one audio track from the set of active microphones. The N clearest signals from the active microphones might be chosen. Alternatively, the signals from all active microphones can be saved.

Fig. 4 illustrates a block diagram of a representative hardware implementation for a visitor wand in a specific embodiment according to the present invention. Fig. 4 illustrates visitor wand 300 that is provided with an antenna 316 coupled to a high-frequency circuit 420. An audio circuit unit 430 connects the high-frequency circuit 420 with the speaker 314 and the microphone 308. The audio circuit unit 430 and the high-frequency circuit 420 are connected to a CPU 460 that controls various functions of the components of visitor wand 300. The CPU 460 controls the high-frequency circuit unit 420 and the audio circuit unit 430 according to a control program stored in a memory 480 that is connected to the CPU 460. Memory 480 comprises RAM, flash RAM, and/or ROM in various specific embodiments. The CPU 460 is also connected to the keypad 304 and the display 302, which provide input and output of information to/from the visitor. The CPU 460 displays on the display unit 302 information necessary for communication, such as a state of a connection, a telephone number of a person being telephoned, an e-mail addresses, e-mail data to be received or transmitted, and the like, as well as information necessary for the user of the visitor wand 300. The CPU 460 is connected to an I/O port 466, which provides interface to

a plurality of sensors and devices. For example, camera 310, biometric sensors 312a, and 312b, and so forth, are connected with, and accessible by, CPU 460 via I/O port 466.

While the preceeding explanation refers to the visitor wand 300 illustrated by Fig. 3A, this explanation is intended as merely an example, and is not intended to be limiting. Further, the visitor wands of embodiments illustrated by Figs. 3B-3C are realized using similar components and techniques as discussed above with reference to Fig. 4. Thus, further discussion of the internal hardware of these embodiments will be omitted for brevity.

Fig. 5 illustrates a representative flowchart of processing visitor information in a specific embodiment according to the present invention. Fig. 5 illustrates a step 502 of recording information about a visitor at the visitor kiosk 100. Then, in a step 504, the information is placed in a format for storage. In a specific embodiment, the information is placed in HTML format. However, a variety of other formats are used in specific embodiments. Next, in a step 508, the information is stored in a database. The database can be located in a sever 22 connected to the visitor kiosk 100. In another embodiment, the information can be stored locally in a database resident at the visitor kiosk 100. In a step 508, information about the visitor can be obtained from the database, as well as a variety of other sources, such as for example, the Internet, world wide web, and the like. Next, in a step 510, the information about the visitor is provided to users of the information. The users can query and retrieve the information about the visitor using their workstations, or receive information on a telephone, for example. In various specific embodiments, the order of these steps can be altered. Further, in some embodiments, not all of these steps will be present. Yet further, in many embodiments, other steps can be included. These modifications will be readily apparent to those of ordinary skill in the art.

Figs. 6A-6M illustrate representative screens displayed during a representative greeting session with a specific embodiment according to the present invention. Fig. 6A illustrates a representative welcoming screen. Welcoming screens can comprise displays of information as part of a greeting, including a slide show of images or products, advertisements, updated stock values, and daily cartoons, for example. Information can be selected according to local preferences and can vary depending upon target audience. Here, the welcome screen includes a picture of the facility being visited 601. The visitor can select a preferred language using the touch screen, keyboard, or mouse to select from the language buttons 602.

Fig. 6B illustrates a screen presenting the visitor with a plurality of persons from which a person to be visited can be selected. In this specific embodiment, persons are

indicated by selection buttons 605 having the persons' name. However, in alternative embodiments, the selection buttons can be images of the person, for example. Some selection buttons can be used to indicate a group of persons 606. In the specific embodiment illustrated by Fig. 6B, an "Unknown" button 607 and a "Restart" button 608 enable the visitor to indicate she does not know the name of the person to be visited or that she would like to begin the sign-in process again, respectively.

Fig. 6C illustrates a representative screen in which the visitor can specify a purpose of the visit. The visitor can select a purpose using a scrolling window 610. Selection can be made by moving a cursor with a mouse, trackball, or keyboard, or by using a touch screen. The visitor can indicate to the kiosk that the selection is complete using a "Done" key 611. In this embodiment, the visitor can also select a "Back" button 612, or a "Restart" button 613. In another specific embodiment, the user types the purpose for the visit manually using a keyboard.

Fig. 6D illustrates a representative prompt screen to scan a business card, or manually enter the visitor's pertinent information using a keyboard. This screen provides a textual instruction 615, as well as picture examples 616, to assist the visitor in inputting a business card. In this embodiment, the visitor can also select a "Back" button 617, or a "Restart" button 618.

Fig. 6E illustrates an instruction screen for scanning the visitor's business card. This screen provides a textual instruction 620, as well as picture examples 621, to assist the visitor in inputting a business card. In this embodiment, the visitor can also select a "Back" button 622, or a "Restart" button 623.

Fig. 6F illustrates representative screen for prompting the visitor to enter a name and an organization name. The screen of Fig. 6F can be displayed if the visitor has selected manual entry of this information responsive to the screen of Fig. 6D, or if the business card scanner was unable to read the visitor's business card for some reason. Fig. 6F provides a textual instruction 625, a name field 626 and an organization field 627. The visitor can enter the appropriate information into name field 626 and organization field 627 using the keyboard, for example, or other input device. In this embodiment, the visitor can also select a "Back" button 628a, a "Next" button 628b, or a "Restart" button 629.

Fig. 6G illustrates a representative screen requesting the visitor's permission to take a picture. This screen provides a textual message 630 and an image 631. The visitor can select from either a "Yes" button 632 or a "No" button 633. In this embodiment, the visitor can also select a "Restart" button 634.

Fig. 6H illustrates a representative screen showing the visitor the image provided by the camera 635. The visitor can take the picture by selecting the "Take" button 636. In this embodiment, the visitor can also select a "Back" button 637, or a "Restart" button 638. A textual message 639 prompts the visitor with instructions. In a specific embodiment, the camera 635 can capture a plurality of pictures of the visitor automatically. Then, the plurality of pictures is presented to the user so that the user can select one or more of the plurality of pictures using a mouse, or other pointing device, or the keyboard. In these embodiments, the visitor does not have to select the "Take" button.

Fig. 6I illustrates a representative results screen showing the visitor the image acquired, along with the visitor's information. The visitor may make changes to the text using an "Edit Text" button 640, or retake the picture by selecting the "New Picture" button 641. In this embodiment, the visitor can also select a "Restart" button 642. When the visitor is satisfied with the image, the visitor can select the "Done" button 643 to continue. In an alternative embodiment, the steps illustrated by Figs. 6H-6I are replaced with a single prompt enabling the user to select from a plurality of images that are captured by the camera automatically. The images are captured automatically responsive to the visitor providing permission to take her picture by selecting the "Yes" button 632 in Fig. 6G. In this embodiment, the information gathered about the visitor is displayed 644. Optionally, the kiosk can retrieve information about the visitor's previous visit and display it as well 645.

Fig. 6J illustrates a representative prompt screen for recording the visitor's speech. The visitor is invited to say her name with a text message 646. The visitor can select the "Done" button 647 when complete. Fig. 6K illustrates a representative screen prompting the visitor if another person is present with the visitor 650. The visitor can reply by selecting the appropriate button. If the visitor selects the "Yes" button 651, the next visitor is provided with the same prompts illustrated by Figs. 6A-6K. Otherwise, if the visitor selects the "No" button 652, the welcome screen illustrated in Fig. 6L is displayed. In this embodiment, the visitor can also select a "Restart" button 653.

Fig. 6L illustrates a representative final screen displayed at completion of a session with a visitor. In this embodiment, the screen includes a textual message 655. The visitor is also provided with a last opportunity to restart the session by selecting a "Restart" button 656.

Fig. 6M illustrates a representative example HTML representation of a visitor that is created from the information gathered by the visitor kiosk 100 in a specific embodiment according to the present invention. Representation 660 comprises a digitized

image 661 of the visitor, and a digitized image 662 of the visitor's business card. In some embodiments, images of both sides of a two sided business card will be included. A representative textual title 663 indicates the name of the visitor, and the date and time of the visit. A URL 664 provides the address of the web page for this visitor. A data field 665 provides a link to results of an OCR program that has been applied to the visitor's business card. A handling field 666 provides a link to a print process, which provides a mechanism for printing the visitor's information. For example, a copy of the visitor's business card image or a formatted copy of the visitor's web page information can be printed. A searching field 667 provides a mechanism for entering a search parameters for information about the visit. For example, a user can search for information about a visitor's previous visits, search for documents containing the visitor's name, or find other visitors who accompanied a particular visitor. A communications field 668 provides links to send the visitor information by email, or publish the visitor information on the world wide web. In various specific embodiments, not all of these fields will be present. Yet further, in many embodiments, other fields can be included. These modifications will be readily apparent to those of ordinary skill in the art.

Fig. 7 illustrates a representative example technique for tracking visitor wands in a specific embodiment according to the present invention. Fig. 7 illustrates visitor kiosk 100 connected by network 20 to a plurality of locators, including locators 700, 702 and 704 that are spread throughout the facility. Locators 700-704 communicate via a wireless communication link to a representative visitor wand 340. Using a global positioning system (GPS) (not shown), the locators 700-704 can determine a position of a visitor within the facility when the visitor wand 340 is in communication with any of the locators 700-704. In specific embodiments, visitor position information at various time intervals is gathered and recorded. From such data, one or more histories can be prepared. For example, a personal history for the visitor comprises where the visitor has been within the facility. Another type of history, called a location history, comprises who has visited a particular location within communication range of one of the plurality of locators 700-704. Other types of histories can also be compiled. For example, histories tracking meeting locations and/or frequency, visitor wand use, and the like are compiled in specific embodiments.

The visitor wand 340 communicates information to the locator 700. This information comprises, for example, an identifier, or business card information, a visitor name, a URL of a homepage, and the like. The locator 700 communicates information to the visitor wand 340, as well. For example, in a representative embodiment, the locator 700

communicates a locator box descriptive identifier, a locator box URL, a geographical location, such as longitude/latitude, for example, a current time of day, and the like to the visitor wand 340. In a specific embodiment, both the personal and location histories are updated with a time stamped event, such as the arrival of a visitor possessing a particular visitor wand. In the case of the personal history, the event can include details about the location. In particular, the URL of the locator box 700 enables the user to subsequently retrieve information such as attendees of a meeting other than the visitor, for example. The location history can include details about the visitor. Various specific embodiments include other types of capture devices, readily apparent to those of ordinary skill in the art, to augment these histories. For example, in a specific embodiment, a passive badge or ID card is used to implement the visitor wand 340. A variety of communications technologies can be used to provide communication between the visitor wand 340 and the locators 700-704. For example, Bluetooth™, direct connection, visual (e.g., as used by Timex™ Data Link™ watch), mobile phone, a pager or a short messaging service (SMS), magnetic card reading, infrared link, and the like provide the communications path in specific embodiments. Further, the locator 700 can connect to the Internet by a wireless connection.

Fig. 8 illustrates a representative visitor information look up procedure in a specific embodiment according to the present invention. In specific embodiments, information about a visitor can be used to provide a personal name lookup function. Fig. 8 illustrates a workstation 850 viewing an email document 840. When reading a document, such as the email 840 depicted on the screen of workstation 850, the user can invoke the personal name lookup function by clicking a browser button, or a button on a user's toolbar, for example. The source for the document 840 is passed to a process that implements the personal name lookup function. The personal name lookup process scans the document 840 to locate personal names. Then, the personal name lookup process requests information about the persons from the server 22. Personal names in the document for which there are records on the server 22 can be replaced by a hypertext link 825 to these records. These hypertext links can point to the record of visits that a person has made to the company, for example. The user clicks the hypertext link 825 to open an associated record 810 of the visitor's information. The user may view information about the visitor stored in the associated record 810. For example, the user may indicate that she wishes to view a picture of the visitor by selecting the hypertext link 825 with the mouse. The picture of the visitor can serve to refresh the user's memory about that person. Specific embodiments

incorporating personal name lookup provide a solution to the problem of name-to-face mapping.

In an alternative embodiment, the personal name lookup function is implemented using a proxy. Accordingly, the hypertext links 825 are automatically inserted. In another specific embodiment, the world wide web is searched for home pages or email addresses associated with each person's name using, one of a variety of popular search engines in web sites such as for example, http:// www.whowhere.lycos.com, and the like.

In an alternative embodiment, a portable visitor kiosk comprising a digital camera and an option portable card scanner is provided. Software running on the camera enables persons being visited to take pictures of the people they meet. These persons can speak their names, affiliations, reason for meeting, into a microphone attached to the camera, or type this information using a keypad on the camera. This data can be maintained on the camera or it can be downloaded to a server 22. In a specific embodiment, the information can be sold as a web service.

The preceding has been a description of the preferred embodiment of the invention. It will be appreciated that deviations and modifications can be made without departing from the scope of the invention, which is defined by the appended claims.

WHAT IS CLAIMED IS:

1. A visitor information gathering apparatus, comprising:

a display;

at least one of a plurality of input devices;

a storage;

a processor; and

at least one of a plurality of sensors, wherein

said processor gathers information about visitors from said at least one of a plurality of input devices from responses made by said visitors to prompts provided by said processor through said display; and wherein said processor substantially contemporaneously gathers information about said visitors from said at least one of a plurality of sensors; and wherein said processor stores said information about visitors into said storage.

2. The apparatus of claim 1, wherein said information about said visitors is gathered from said at least one of a plurality of sensors without said visitor being aware of said gathering.

3. The apparatus of claim 1, further comprising a music playing device, wherein said processor controls playing of music to said visitors.

4. The apparatus of claim 1, wherein said information about visitors is at least one of a name, an organization represented by a visitor, a purpose of a visit, a date of a visit, a time of a visit, a person to be visited, an identity of a group of visitors visiting together.

5. The apparatus of claim 1, wherein said processor displays on said display at least one of a greeting, a slide show of product images, advertising, stock values, daily cartoons, and news.

6. The apparatus of claim 1, further comprising a scanner that scans at least one of a first side and a second side of a business card having printing on at least one of said first side and said second side; and wherein, responsive to detecting text on said at least one of said first side and said second side, said processor processes said text in accordance with a language of said text.

7. The apparatus of claim 1, further comprising a microphone, wherein said microphone provides input of speech of said visitors.

8. The apparatus of claim 1, further comprising a video camera, wherein said video camera provides input of images of said visitors.

9. The apparatus of claim 1, further comprising a speaker, wherein said speaker provides directions to said visitor.

10. The apparatus of claim 1, further comprising at least one of a plurality of visitor wands, said visitor wands recording experiences of said visitors.

11. The apparatus of claim 1, further comprising biometric sensors, said biometric sensors recording biometric information about said visitor.

12. The apparatus of claim 1, further comprising a handwriting tablet, said handwriting tablet providing a sample of handwriting of said visitors.

13. The apparatus of claim 1, further comprising a security sensors, said security sensors providing information about potential threats.

14. The apparatus of claim 1, further comprising a telephone interface, said telephone interface providing a telephone message to a person to be visited that said visitors have arrived.

15. The apparatus of claim 1, further comprising a web interface, said web interface providing a readily accessible source of information gathered about said visitors.

16. A method for collecting information about visitors, said method comprising:

gathering information about said visitors in an interactive session with an automated kiosk;

placing said information into a format in which said information may be stored;

storing said information for retrieval; and

automatically obtaining information about said visitor from at least one of a plurality of sources.

17. The method of claim 16, wherein gathering information about said visitors at said automated kiosk comprises obtaining information from said visitor using a process of which said visitor is aware (conscious capture) and obtaining information about said visitor using a process of which said visitor is not aware (unconscious capture).

18. The method of claim 16, further comprising:

providing said information about said visitor and said information gathered at said kiosk to at least one of a plurality of other users of said information.

19. The method of claim 16, wherein obtaining information about said visitor from a plurality of sources comprises at least one of performing a search on the Internet, searching a publicly available database, searching a database of visitor information obtained from said automated kiosk, and searching a local document database.

20. A system for tracking activity within a facility, said system comprising:

a plurality of locator apparatuses;

a network, interconnecting said plurality of locator apparatuses; and

at least one of a plurality of portable visitor wands; wherein,

said at least one of a plurality of portable visitor wands communicates an identity to at least one of said plurality of locator apparatuses; and wherein said at least one of said plurality of locator apparatuses track position of a visitor based upon said communicated identities.

21. The system of claim 20, wherein said communication is performed by at least one selected from an infrared communication link, a radio communication link, an optical communication link, sensing a magnetic card, a telephone communication link, a pager communication link, and a Bluetooth™ communication link.

22. The system of claim 20, wherein said locator apparatuses are further operative to provide a history of visitors to at least one of said locator apparatuses.

23. The system of claim 20, wherein said locator apparatuses are further operative to provide a history of locator apparatuses visited by a particular visitor.

24. A computer programming product for collecting information about visitors, said computer programming product comprising:

code for gathering information about said visitors in an interactive session with an automated kiosk;

code for placing said information into a format in which said information may be stored;

code for storing said information for retrieval;

code for obtaining information about said visitor from at least one of a plurality of sources;

code for providing said information about said visitor and said information gathered at said kiosk to persons interested in said information; and

a computer readable storage medium for holding the codes.

25. An apparatus for automatically populating a database, said apparatus comprising:

a display;

at least one of a plurality of input devices;

a storage; and

a processor; wherein

said processor captures information from said at least one of a plurality of input devices, said information entered responsive to prompts provided by said processor through said display; and wherein said processor stores said information about visitors into said storage.

26. An apparatus of claim 25, wherein said information comprises personnel information about at least one of a plurality of employees, said storage further comprising a database for storing said personnel information.

27. An apparatus of claim 25, further comprising at least one of a plurality of sensory devices, said sensory devices operative to provide additional information which is incorporated into said personnel database, said additional information associated with said personnel information by at least one of a plurality of linkages.

28. An apparatus of claim 27, wherein said additional information comprises at least one of an image, a time of entering said personnel information.

29. An apparatus of claim 25, further comprising using said personnel information to annotate documents.

30. An apparatus of claim 29, wherein using said personnel information to annotate documents further comprises replacing at least one of a plurality of names with hypertext links to said personnel information.

31. A method for providing an image, said method comprising:

automatically capturing at least one of a plurality of images of a person;

providing to said person said at least one of a plurality of images; and

receiving from said person an indication of a preferred image, said preferred image selected from among said at least one of a plurality of images.

A NETWORKED PERIPHERAL FOR VISITOR GREETING, IDENTIFICATION, BIOGRAPHICAL LOOKUP AND TRACKING

ABSTRACT OF THE DISCLOSURE

According to the invention, a visitor kiosk for the capture and storage of personal information about visitors. The visitor kiosk is placed at the entry point to a facility being monitored. Each visitor signs in at the kiosk. Their business card and an image of their face are scanned. If they do not have a business card, their name and company are entered manually. They also enter the name of the person they are visiting and the purpose for their visit. The person they are visiting is notified of the arrival of the visitor by email or by voice telephone. The data about the visitor is stored locally or remotely. Automatic lookups of various information about the visitor are performed and communicated to the person being visited. A network interface allows users to enter information about visitors they are expecting to arrive. A telephone interface is provided for input of voice greetings as well as checking on the arrival status of visitors.

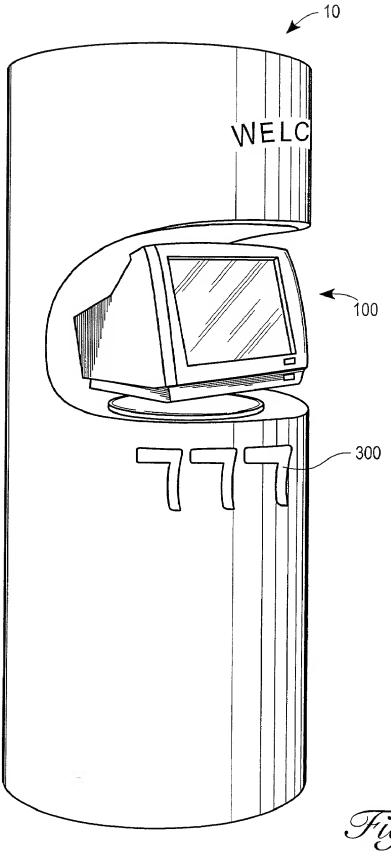


Fig. 1

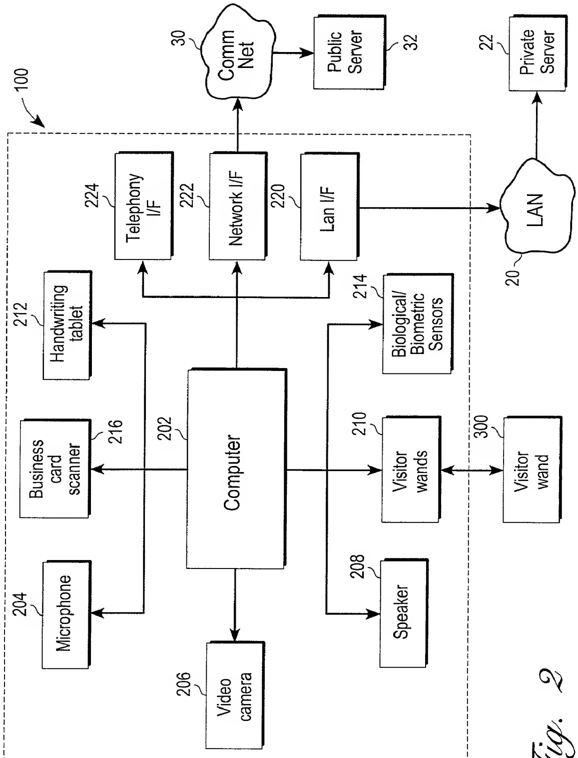

100
Microphone
204
Business card scanner
216
Handwriting tablet
212
Video camera
206
Computer
202
Telephony I/F
224
Network I/F
222
Lan I/F
220
Speaker
208
Visitor wands
210
Biological/ Biometric Sensors
214
Visitor wand
300
Comm Net
30
Public Server
32
LAN
20
Private Server
22

Fig. 2

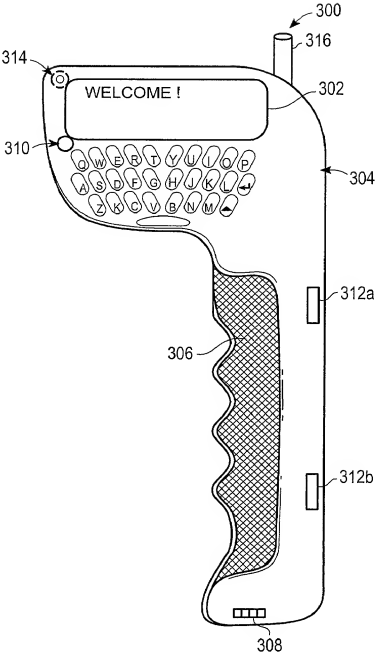


Fig. 3A

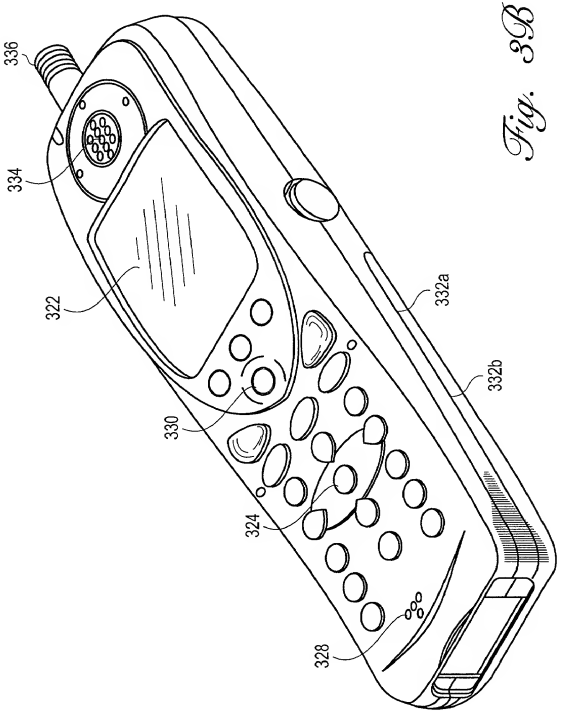


Fig. 3B

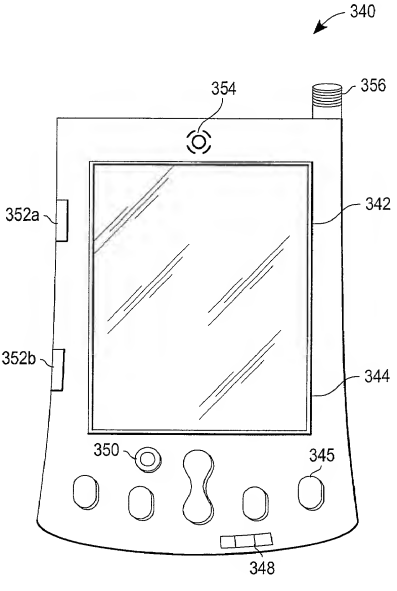


Fig. 3C

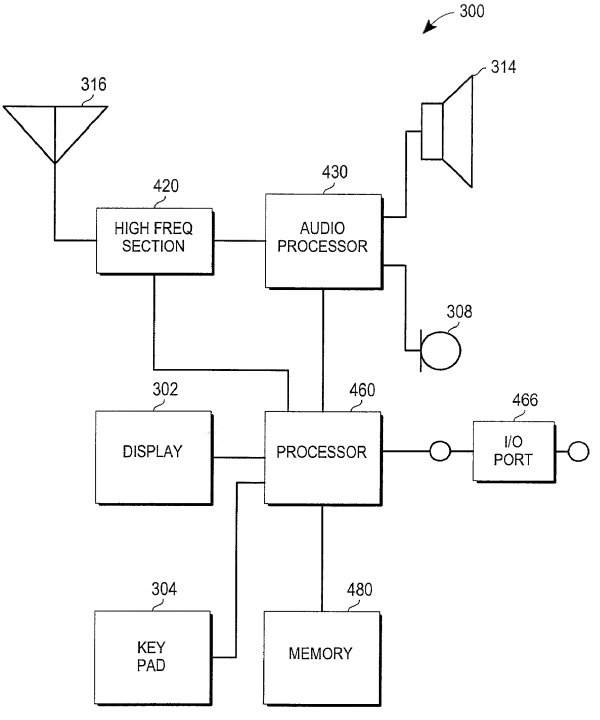

300
316
314
420
HIGH FREQ SECTION
430
AUDIO PROCESSOR
308
302
DISPLAY
460
PROCESSOR
466
I/O PORT
304
KEY PAD
480
MEMORY

Fig. 4

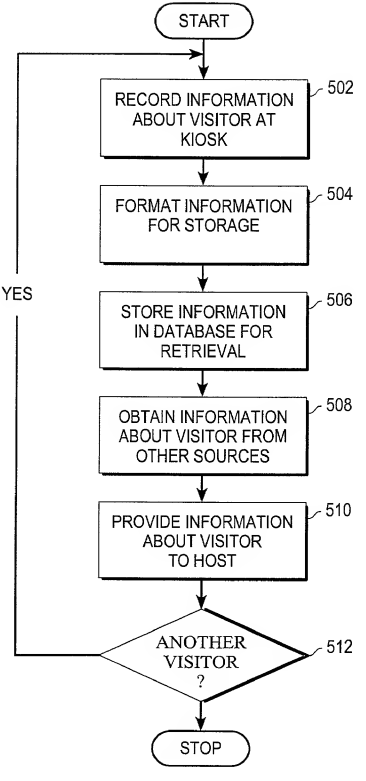

START
RECORD INFORMATION ABOUT VISITOR AT KIOSK
502
FORMAT INFORMATION FOR STORAGE
504
YES
STORE INFORMATION IN DATABASE FOR RETRIEVAL
506
OBTAIN INFORMATION ABOUT VISITOR FROM OTHER SOURCES
508
PROVIDE INFORMATION ABOUT VISITOR TO HOST
510
ANOTHER VISITOR ?
512
STOP

Fig. 5

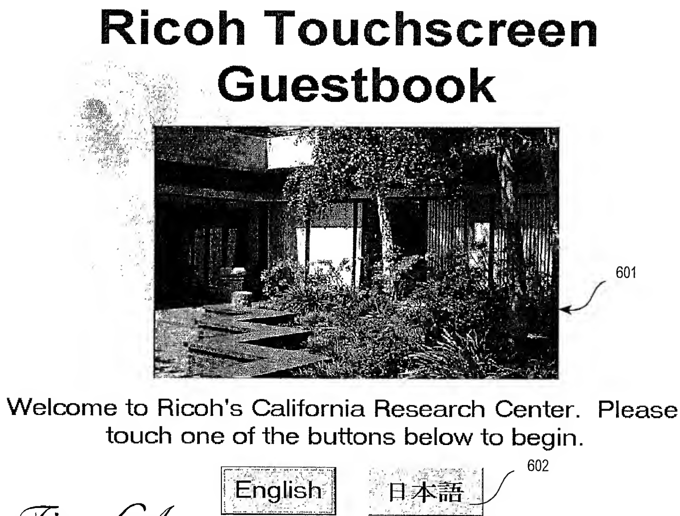

Ricoh Touchscreen
Guestbook
601
Welcome to Ricoh's California Research Center. Please
touch one of the buttons below to begin.
602
English
日本語

Fig. 6A

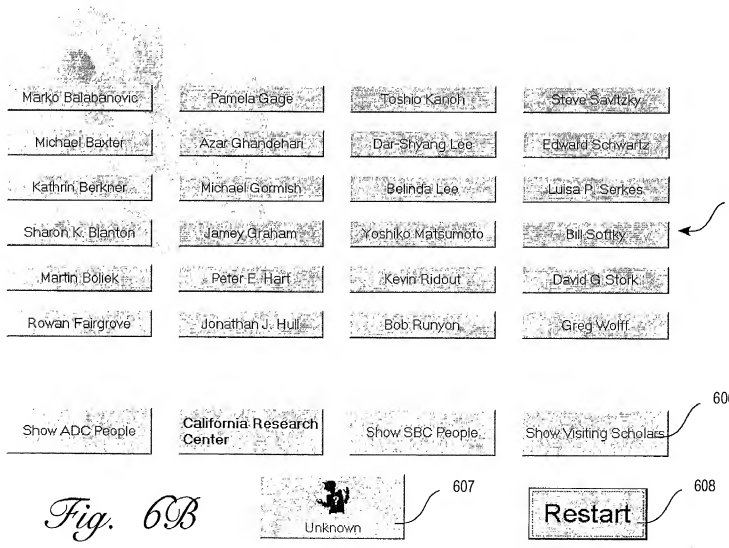

Who are you here to see today?
Marko Balabanovic
Pamela Gage
Toshio Kanoh
Steve Savitzky
Michael Baxter
Azar Ghandehari
Dar-Shyang Lee
Edward Schwartz
Kathrin Berkner
Michael Gormish
Belinda Lee
Luisa P. Serkes
605
Sharon K. Blanton
Jamey Graham
Yoshiko Matsumoto
Bill Softky
Martin Boliek
Peter E. Hart
Kevin Ridout
David G Stork
Rowan Fairgrove
Jonathan J. Hull
Bob Runyon
Greg Wolff
606
Show ADC People
California Research Center
Show SBC People
Show Visiting Scholars
607
Unknown
608
Restart

Fig. 6B

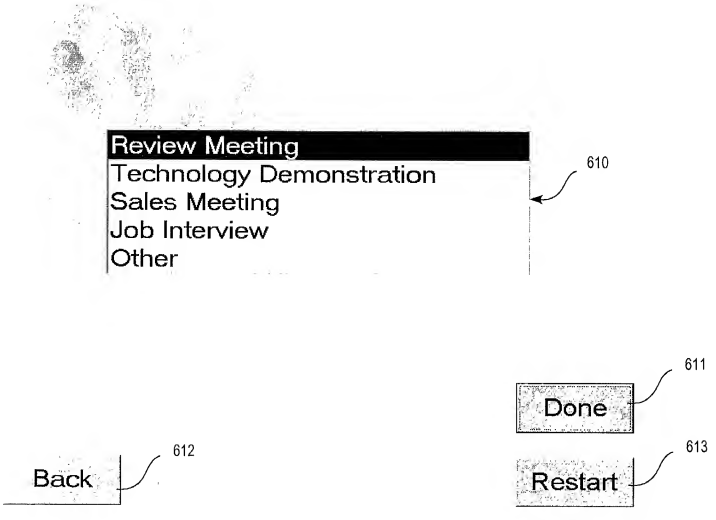
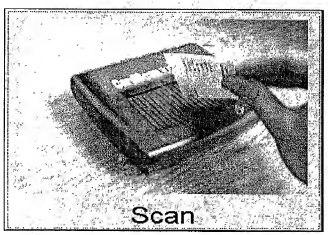
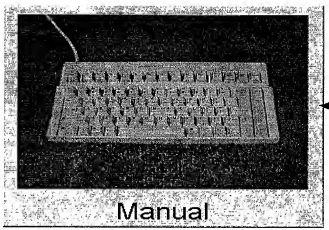


Fig. 6C

615

Please choose business card scan or manual entry by pressing one of the buttons below.





616

617

戻る
Back

618

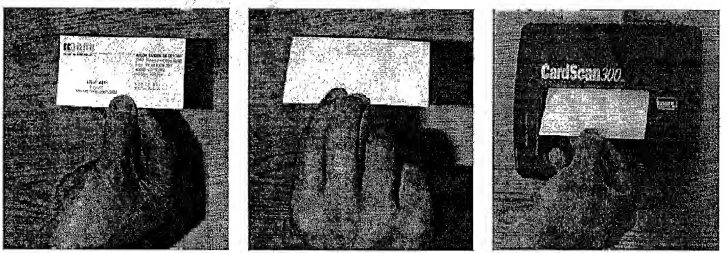
初めへ
Restart

Fig. 6D

Please insert your business card face down in the CardScan.

620

1 2 3



621

戻る
Back

622

Fig. 6E

初めへ
Restart

623

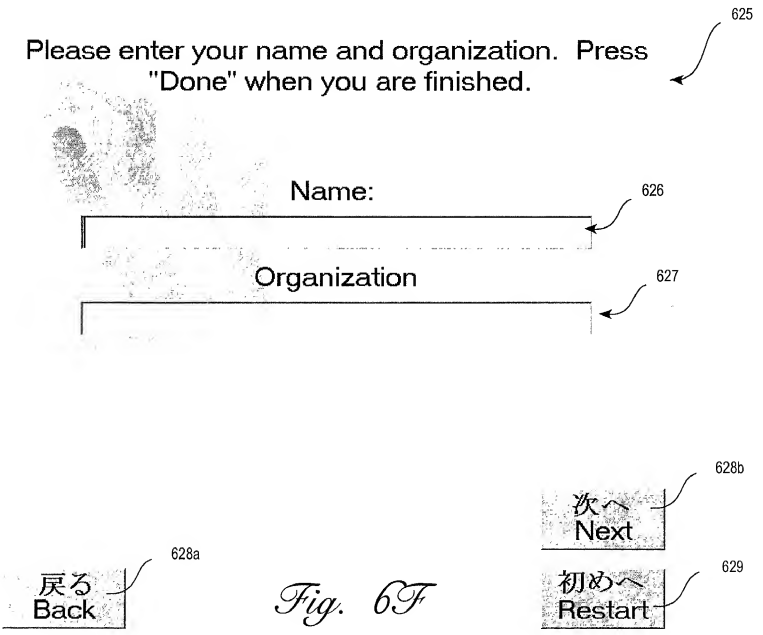


Fig. 6F

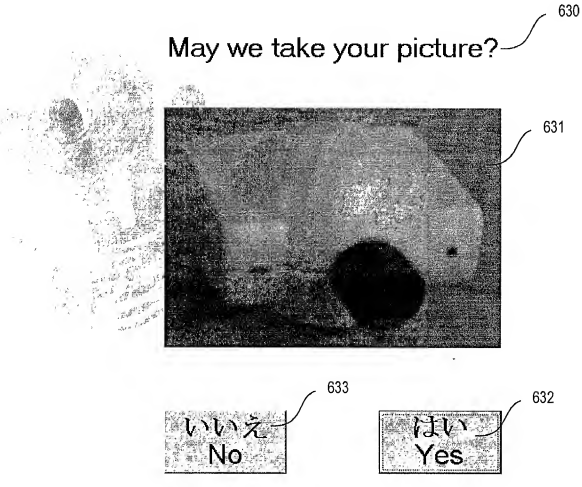


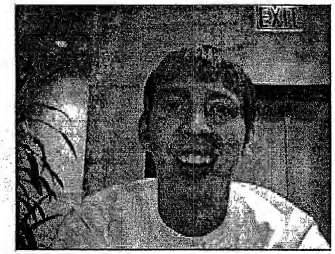
Fig. 6G


635
639
Please look at the camera and press "Take"
when you are ready.
636
撮影
Take
637
戻る
Back
638
初めへ
Restart

Fig. 6K

Welcome!

Host:
Derek Poppink



次へ
Done
643

Name:
Derek Poppink
644
Organization
RSV

645
Your last visit was 12:35 PM Wednesday, August 11, 1999.

640
やり直し
Edit Text

641
撮影
New Picture

642
初めへ
Restart

Fig. 6I

646

Please say your name and press "Done".

647

Done

Fig. 6J

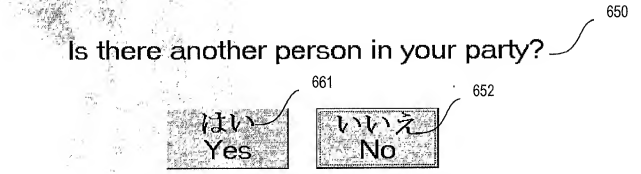

650
Is there another person in your party?
661
はい
Yes
652
いいえ
No

Fig. 6K


653
始めへ
Restart

655

Thank you for visiting the California Research Center. Please have a seat while you are waiting.

Fig. 6L

656

初めへ
Restart

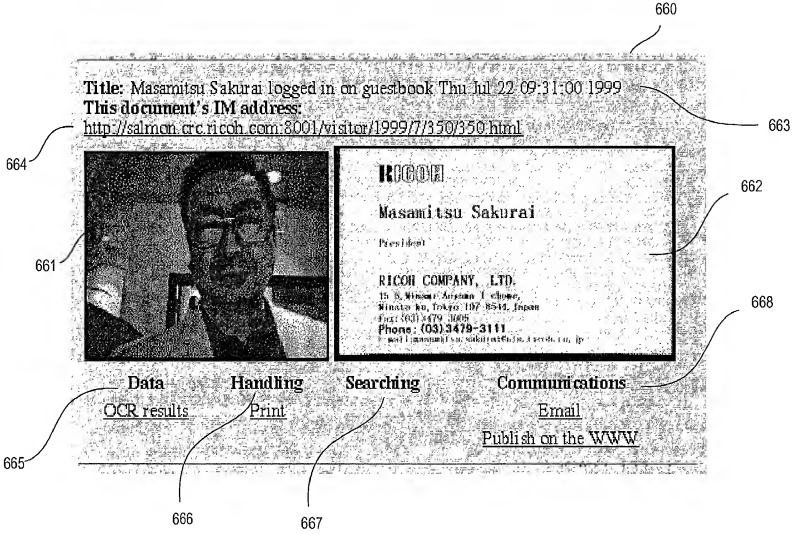

660
Title: Masamitsu Sakurai logged in on guestbook Thu Jul 22 09:31:00 1999
This document's IM address:
http://salmon.crc.ricoh.com:8001/visitor/1999/7/350/350.html
663
664
661
662
RICOH
Masamitsu Sakurai
President
RICOH COMPANY, LTD.
15 8, Minami-Aoyama 1-chome,
Minato-ku, Tokyo 107-8544, Japan
Fax: (03)3479-3006
Phone: (03)3479-3111
668
Data
Handling
Searching
Communications
OCR results
Print
Email
Publish on the WWW
665
666
667

Fig. 6M

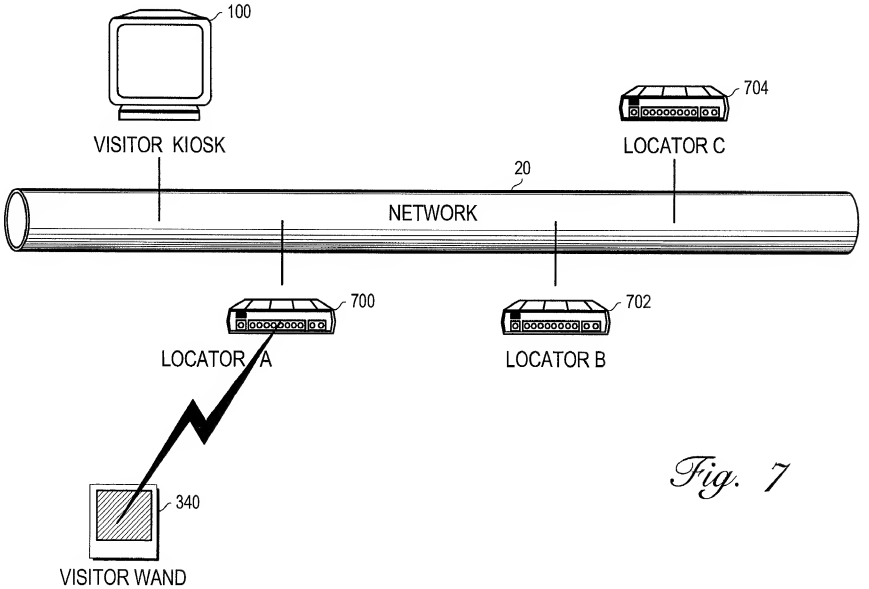

100
VISITOR KIOSK
704
LOCATOR C
20
NETWORK
700
LOCATOR A
702
LOCATOR B
340
VISITOR WAND

Fig. 7

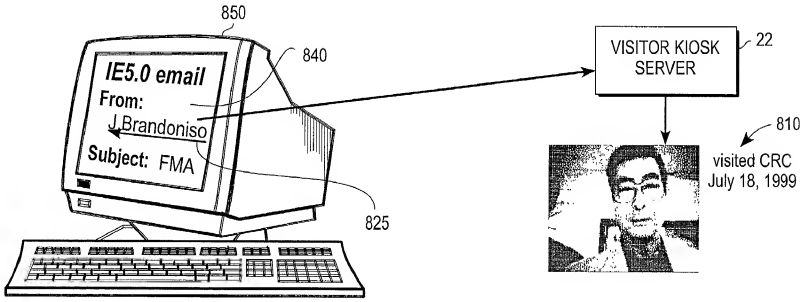

850
840
IE5.0 email
From:
Brandoniso
Subject: FMA
825
VISITOR KIOSK SERVER
22
810
visited CRC
July 18, 1999

Fig. 8